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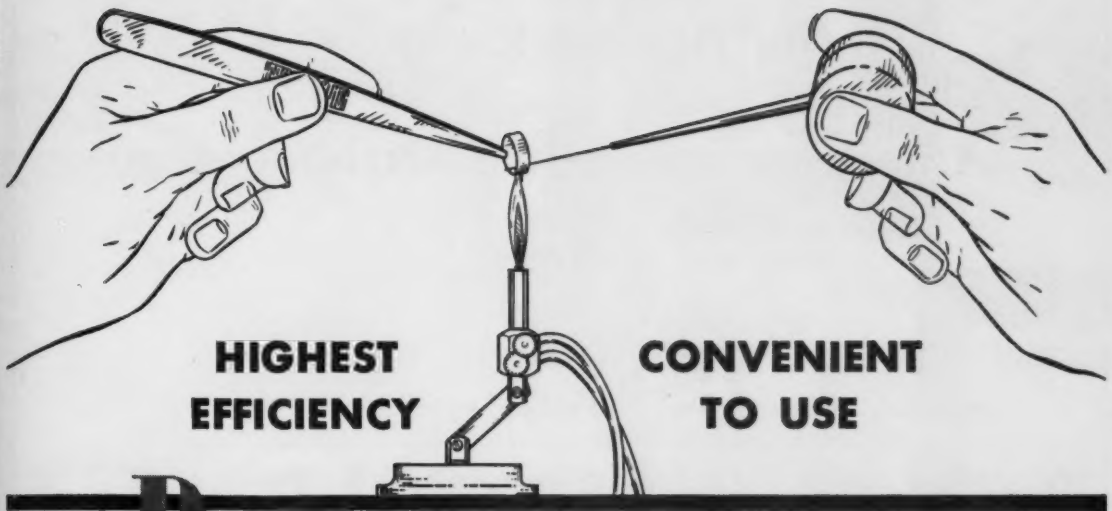

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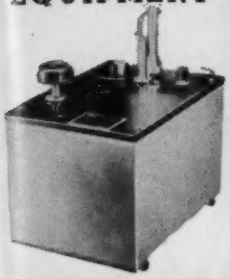

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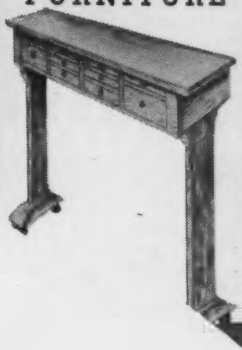

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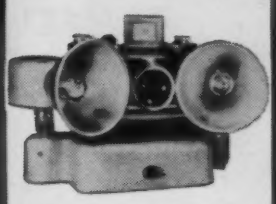

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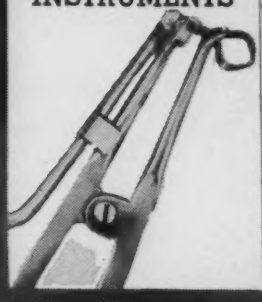

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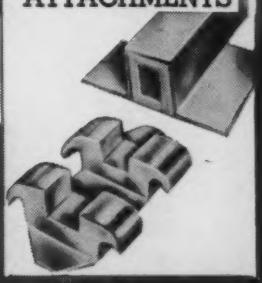

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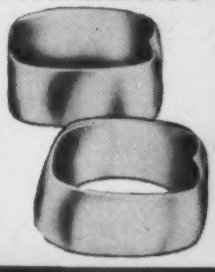

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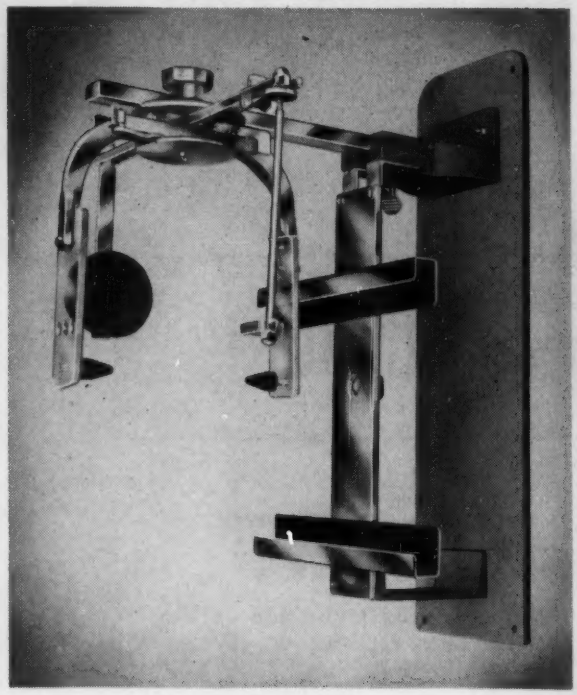

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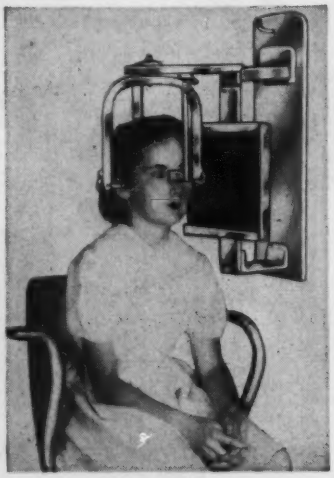

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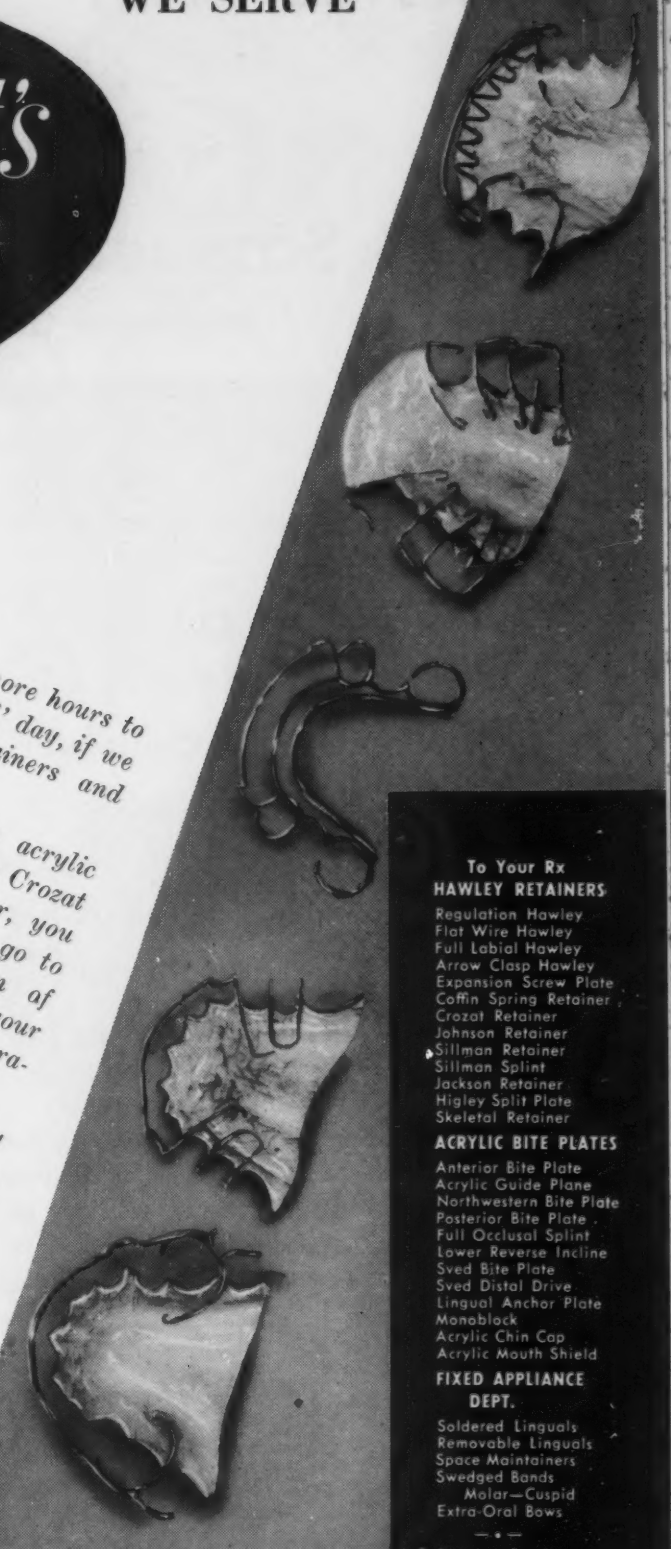

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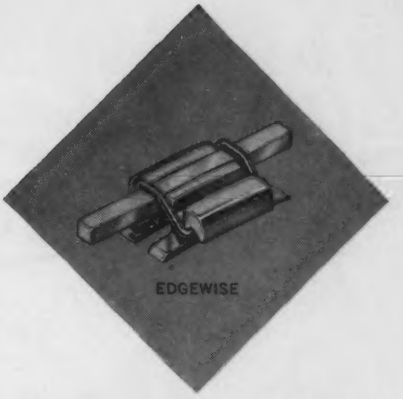

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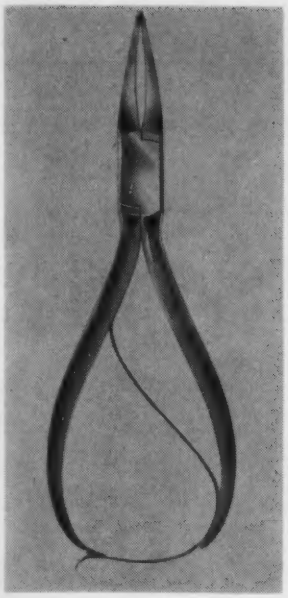

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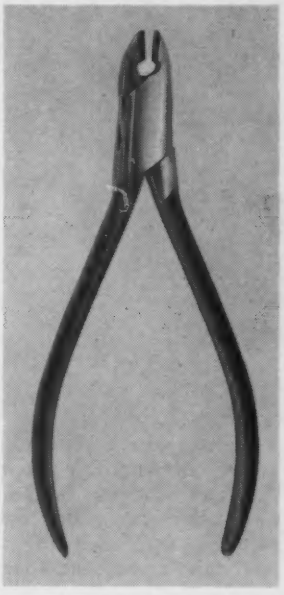

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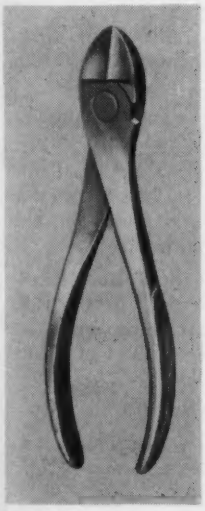

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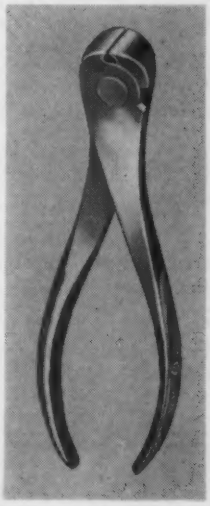

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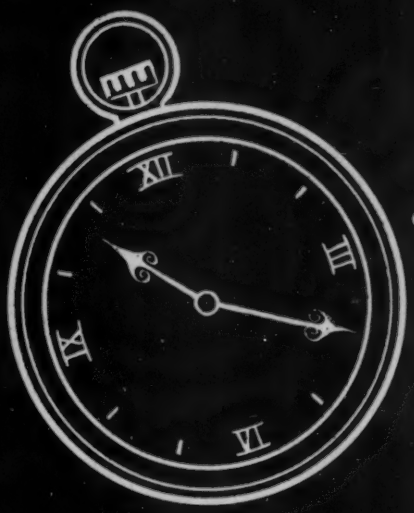

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American Journal
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VOL. 43 MARCH, 1957 No. 3

Original Articles

PRESIDENT'S ADDRESS, SOUTHWESTERN SOCIETY OF ORTHODONTISTS

OTT L. VOIGT, D.D.S., HOUSTON, TEXAS

IT IS a pleasure to welcome you to Houston for this thirty-sixth annual session of the Southwestern Society of Orthodontists. This is your third visit here in the past six years, and it is our hope that you will gain as much knowledge from this meeting as you have from those in the past.

It is with sorrow that I report the death of one of our beloved and respected members, Dr. Elton Harris of Austin. Dr. Harris devoted much of his time to work with the Texas State Dental Association, as well as to this Society, and we will miss him greatly.

I wish to express my thanks and gratitude to Drs. Wilton M. Krogman, Alton W. Moore, and Edward C. Hinds for the time and effort they have contributed in the preparation of our program. We are fortunate that each of them accepted the invitation to teach us a part of his knowledge. For the success of this program, we are indebted to Thermon Smith and his Program Committee. A major part of their work was completed immediately after the adjournment of our last meeting. I also wish to express my appreciation and sincere thanks to Marcus Murphey and his Local Arrangements Committee for the vast amount of work and time they have given to make this meeting an enjoyable and successful one. I am deeply indebted for the advice and guidance given me by the Board of Directors, the appointed committees, and our very efficient secretary, Harold Born.

Presented at the thirth-sixth annual meeting of the Southwestern Society of Orthodontists, Houston, Texas, October, 1956.

Before submitting to you the few recommendations that I shall propose, I should like to review with you a change which I believe has occurred within our organization in the past few years. Immediately following the war, this Society approached a stage of disunity that threatened to break it into separate factions. This may have been caused by misunderstanding and intolerance, it may have been due to the war years, or it may have been due to the fact that the organization had grown beyond the desires of some of us who had enjoyed those prewar meetings where everyone knew everyone else and the fellowship meant as much as the knowledge we gained from our programs. At any rate, we seemed to resent any change that might disrupt this closed organization. We were intolerent of those who did not agree that what we had was all that we needed. It is possible that this state of affairs was sensed by only a few, but we felt that something should be done to correct this misunderstanding while there was still time.

A change has occurred in the past few years, as evidenced by members who have again taken an active part in the work of the Society, by the fact that programs have been arranged that will interest the entire membership, and by the formation of study groups within the Society, where those with totally different concepts of diagnosis and treatment can meet and discuss orthodontics without misunderstanding. Let us keep it that way and continue to be tolerant of those who differ with us, and courteous to them, even though we cannot agree with what they say.

Since the American Association of Orthodontists, at the San Francisco meeting, amended its by-laws regarding the requirements for active membership, and since an additional amendment was submitted at the Boston meeting, it is becoming more difficult for those who aspire to membership in this Society to reach that goal. For this reason, I recommend that we offer associate membership to those who have partially completed the requirements for active membership. Thus, the Society could direct the associate members to complete within the specified time the qualifications for active membership. I submit this recommendation to the Advisory Committee for its consideration.

I also recommend the formation of an Admissions Committee, composed of at least one active member from each of our states to serve a minimum of three years. This committee would be responsible for the examination of each applicant for membership and would report to the Board of Censors the result of such examination.

Since it is mandatory that the by-laws of this component organization coincide with those of the parent organization, it is essential that we amend Article III, Section 2 of the by-laws at this meeting. I recommend that this amendment be made to read: "The requirements for active membership in this Society shall be as provided in Chapter I, Section 2 of the By-Laws of the American Association of Orthodontists." This will enable us to accept applications for membership at our next meeting, regardless of the amendments adopted by the American Association of Orthodontists at its May meeting in New Orleans.

Since many of our members believe that the action taken by the American Association of Orthodontists at San Francisco was premature, but that eventually graduate training in a recognized orthodontic school should be the requirement for membership, it becomes the duty of each of us to work toward the organization and establishment of graduate schools within this area. It is a pleasure to announce that through the efforts of Dr. J. Victor Olson, Dean, and Dr. A. P. Westfall, Professor of Orthodontics, with the opening of this fall term a graduate department of orthodontics was established at the University of Texas Dental Branch. I recommend that the Education Committee direct its efforts to assist Baylor University in its desire to establish a similar orthodontic program.

Again may I say that we in Houston hope that your visit will be one that you will long remember and that you will return home with a renewed interest in orthodontics and pleasant memories of your association with old friends and with new friends you will meet during your stay here.

For the confidence you have shown in me by electing me your president and for the honor of serving you, I thank you most sincerely.

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SURGICAL CORRECTION OF ACQUIRED MANDIBULAR DEFORMITIES

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THE problem of Class III malocclusion has long been one of mutual interest to the surgeon and to the orthodontist. The popular method of removing segments of the body of the mandible, bilaterally, for correction of this problem was first suggested by an orthodontist, Ottolingui, in 1896, and shortly thereafter by Angle, before it was first carried out in 1897 by Vilray P. Blair of St. Louis, who at that time was at the very beginning of a long and illustrious career in oral and plastic surgery. In 1909, at the meeting of the American Society of Orthodontists, in Cleveland, Wayne Babcock, a general surgeon, described his procedure for ramus osteotomy and predicted most of the variations of surgical approaches to the problem of prognathism that were to be developed in the ensuing fifty years.

Prognathism has not always been treated by surgery. In an article entitled "A Remedy for the Protrusion of the Lower Jaw," which appeared in the September, 1842, issue of *The American Journal of Dental Science*, J. S. Gunnell described a headcap and chin sling traction apparatus for the treatment of "limber jaw" or "moose jaw." Gunnell professed to cure most of these cases in one week; some took as long as three to six weeks, but in patients past the age of 16 there was increased difficulty in obtaining a desired result.

Dr. James Cameron reported to me in a personal conversation that the American Academy of Dentistry, composed of five medical doctors and two men possessing no degrees but having a keen interest in dentistry, was organized in New York City in 1828. The first paper presented at this meeting was on the management of the "bulldog" jaw. The first surgical attack on a prognathic jaw was carried out by Dr. S. P. Hullihen of Wheeling, West Virginia, in 1848. This case involved a combination prognathism and open-bite, resulting from an extensive burn many years earlier. A three-stage procedure, including the rotation of a large pedicle flap from the deltoid region, was carried out without benefit of hemostats, antibiotics, antiseptics, or modern anesthesia. The result was very good, and apparently the postoperative course was free from complications. Such was not true of the first bilateral ostectomy performed by Blair. According to the accounts of this particular case by the patient's

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dentist and director of the venture, Dr. James W. Whipple, the postoperative course was fraught with much anxiety and such difficulties, as problems of immobilization, infection, and delayed union.

Since 1898, surgical procedures have been performed in various parts of the mandible, from the condyle to the body as far forward as the premolar area, for the correction of this problem. Fig. 1 shows a tabulation of the important landmarks in the development of these procedures.

Hullihen (1848)—Osteotomy in body of mandible
Blair (1897)—Bilateral ostectomy in body of mandible
Jaboulay (1898)—Bilateral condylectomy
Blair (1905)—Ramus osteotomy for recessive mandible
Babcock (1908)—Ramus osteotomy for prognathism
Harsha (1912)—Ostectomy posterior to last molar with preservation of nerve and artery
Kostecka (1931)—Subcondylar osteotomy for open-bite
Schaeffer (1939)—Subcondylar osteotomy for prognathism
Smith (1941)—Subsigmoid ostectomy
Dingman (1944)—Two-stage bilateral ostectomy
Caldwell (1952)—Vertical osteotomy

Fig. 1.—Chronological development of procedures for correction of prognathism.

Hensel has stated that in all recorded operative procedures there are one or more serious objections, included in the following categories:

1. Hazardous or uncertain technique.
2. Impairment of mandibular function.
3. Section of important nerves.
4. Oral contamination of wound infection.
5. Injury to the parotid gland or facial nerve.
6. Malunion.
7. Nonunion and osteomyelitis.
8. Devitalized or lost teeth.
9. Inherent scars from wound infection.
10. Prolonged disablement.
11. Uncertain results.

In view of such possibilities, each operator should strive to determine which procedure is safest and most certain in his hands. A suspicion is aroused that the procedure must be suited to the particular operator, as well as to the individual patient's needs. The bilateral ostectomy in the body of the mandible seems to be the most popular procedure today, with the ramus osteotomy probably following next in line.

Aside from individual preferences and capabilities, there are certain advantages and disadvantages in the various techniques. Generally speaking, the technique which involves moving the body of the mandible back as a unit has the following advantages:

1. Maintenance of relationship between the arches.
2. Improved angle of the mandible.
3. Preservation of teeth.

Theoretically, this also has one drawback; namely, the derangement of the muscles of mastication. Waldron has criticized the Smith-Robinson subsigmoid ostectomy for this reason. However, Smith and Robinson have reported a large number of successful cases, and I have seen some of the results in my own practice and do not believe that this holds true. The muscular adaptive ability compensates for this change of position without any difficulty. Likewise, Smith has criticized the bilateral ostectomy because of the changes that take place in the soft tissues of the floor of the mouth and the tongue. By the same token, the adaptive ability of these tissues is such that these changes are compensated for without difficulty.

CONDYLECTOMY

This procedure, first performed by Jaboulay in 1898, has had few advocates down through the years . However, a very recent publication by Gonzalez-Ulloa reported ten cases operated on with satisfactory results, within the past six years, although it was necessary to cut down or remove the last molar teeth to compensate for open-bite.

Advantages:

1. No immobilization is necessary.
2. The procedure is fairly simple if one is familiar with the technique.
3. No intraoral wound is created.

Disadvantages:

1. Open-bite.
2. Possible loss of teeth.
3. Limitation of correction.
4. Creation of false joint.
5. This procedure does not move the body back per se, but rocks the body upward in an arc.

"BOW-BACK" PROCEDURE

In 1931 Pettit and Walrath, seeking a procedure for correction of unilateral prognathism, arrived at what they called the "bow-back" procedure. This is essentially a high subcondylar osteotomy performed with the idea of creating a false joint. Temporal fascia is inserted in the osteotomy cut to preserve the false joint. The authors advocate this procedure because of the lessened danger in the technique.

Advantages:

1. The entire arch may be moved as a unit.
2. No intraoral wound is created.
3. The procedure is fairly simple if one is familiar with the surgical approach.

Disadvantages:

1. Creation of false joint.
2. Danger of open-bite.
3. Limitation of correction.

RAMUS OSTEOTOMY

The ramus osteotomy was first performed for prognathism by Wayne Babcock in 1908, although Blair had performed this procedure with a Gigli saw in 1905 for correction of receding jaw. This procedure has probably been used more than any other for the correction of prognathism. Some of the most serious complications result from this operation, however, chief among them being the creation of an open-bite. The separation of the coronoid and condyloid processes from the remainder of the ramus allows the temporalis muscle to pull the upper fragments superiorly. In turn, the masseter and internal pterygoid may rock the angle upward, creating an open-bite. Dingman has described this complication even in the face of interosseous wiring.

Advantages:

1. The entire arch may be moved as a unit.
2. Short procedure, if closed.
3. No intraoral contamination.
4. The procedure avoids mandibular nerves and vessels. (If cut in this procedure, however, there is less opportunity for regeneration than if the cut is through the body of the mandible.)

Disadvantages:

1. Open-bite.
2. Nonunion.
3. Prolonged immobilization.
4. Derangement of muscles of mastication.
5. Parotid fistula.
6. Danger to facial nerve and internal maxillary artery.

BILATERAL OSTECTOMY THROUGH BODY OF MANDIBLE

This was the first procedure performed for developmental Class III malocclusion (prognathism). It was first performed by Vilray P. Blair in 1898, and is probably the safest approach in the greatest number of hands. It does decrease the size of the mandibular arch, which may be desirable in some cases and undesirable in others. In many instances, the malrelation of the molar teeth is not corrected, anteroposteriorly, although a lingual rotation of the mandibular molars can be achieved with benefit in other instances. This procedure also allows for correction of open-bite very nicely.

Advantages:

1. Good access.
2. No danger of open-bite.

3. Open-bite can be corrected with this procedure.
4. Fragments are easy to control, although orthodontic appliances are essential to fixation in these cases.
5. The position of the molars can be improved where the maxilla is narrow.
6. This may be the only feasible procedure where the body of the mandible is elongated.
7. This may be the best procedure for younger patients in the 14- to 16-years-of-age group.

Disadvantages:

1. Nonunion has been reported frequently with this procedure.
2. The procedure does not improve the angle of the mandible.
3. It imvolves the sacrifice of teeth.
4. It may alter the relationship of the maxillary and mandibular arches.
5. Required prolonged immobilization and orthodontic appliances.
6. Injury to mandibular nerves and vessels may be produced.
7. The scar is more conspicuous than in ramus procedures.

Fig. 2.—Subsigmoid ostectomy developed by Arthur Smith. The operative field is approached through a preauricular incision.

SUBSIGMOID OSTECTOMY

Smith and Robinson reported fifty-seven successful cases in the July, 1954, issue of the *Journal of the American Dental Association.* This is an excellent operation and has no serious drawback other than the technical difficulty of the procedure. I have performed this operation on three occasions and obtained excellent results.

Advantages:

1. The entire arch may be moved as a unit.
2. No danger of open-bite.

3. Good union is obtained.
4. Minimum disturbance of temporomandibular joint.
5. No intraoral contamination.

Disadvantages:

1. Surgical difficulty.
2. Time required for procedure.
3. Danger of parotid fistula.
4. Danger of damage to facial nerve.

VERTICAL OSTEOTOMY

Caldwell and Letterman have recently reported a procedure involving a vertical osteotomy through the mid-portion of the ramus, augmented by decortication of the distal fragment. The procedure is characterized by rapid union and minimal period of immobilization. This procedure is even more difficult technically than the subsigmoid ostectomy, and for that reason has few advocates.

Advantages:

1. Rapid union, three to five weeks.
2. No complicated appliances are necessary.
3. No strain on the teeth, because of short period of traction.
4. No limit of correction.
5. The entire arch may be moved as a unit.
6. No intra-oral contamination.

Disadvantages:

1. Surgical difficulties.
2. Time of procedure.
3. Danger of parotid fistula.

SUBCONDYLAR OSTEOTOMY

Limberg, in 1926, mentioned a subcondylar osteotomy, but only in connection with correction of unilateral recessive mandible, and further stated that it was not a satisfactory procedure. Even prior to this, in 1909, Babcock had suggested such an operation as a possible means of correction of prognathism. The procedure was described by Kostecka, in 1931, as a method of correction of open-bite. From this report, Joe Schaffer[23] in Chicago deduced that the same procedure could be used for prognathism and proceeded to carry out this method successfully. Edward Reiter[26] of Cleveland has probably done more of these procedures than anyone else. A report is being published on fifty-two of these cases operated upon by the Reiter group in Cleveland. It is a blind procedure done with a Gigli saw. The complications have been few and success has been almost universal. The idea of a subcondylar osteotomy appears to me to be superior to most other methods because, with this procedure, the coronoid process is left attached to the body of the mandible so that the

temporalis muscle may counteract any tendency toward open-bite. Healing in this area is quite good, and with bony healing one then gets a normal functioning joint, as contrasted with the bilateral condylectomy or "bow-back" procedures. It has seemed to me that an open operation would be superior to a closed operation for several reasons. The direction of the cut may be controlled better and the proximal fragment may be placed lateral to the distal fragment, allowing the external pterygoid to pull the proximal fragment up flush against the distal fragment and aid in healing. Dr. Marsh Robinson reported several cases operated on in this way in the January, 1956, issue of the *Journal of the Southern California State Dental Association.* In the last three cases I have operated upon, I have used this procedure. Two of the patients were edentulous. To date, the results have all been quite satisfactory. Healing is comparatively rapid and traction can be discontinued after six weeks with no danger of an open-bite.

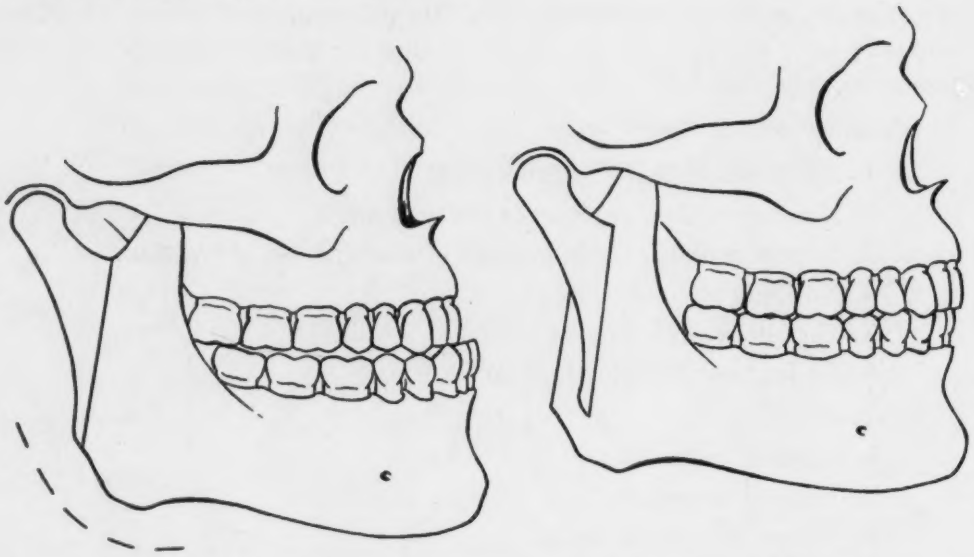


Fig. 3.—Open subcondylar osteotomy. The operative field is approached through the submandibular incision.

Advantages:

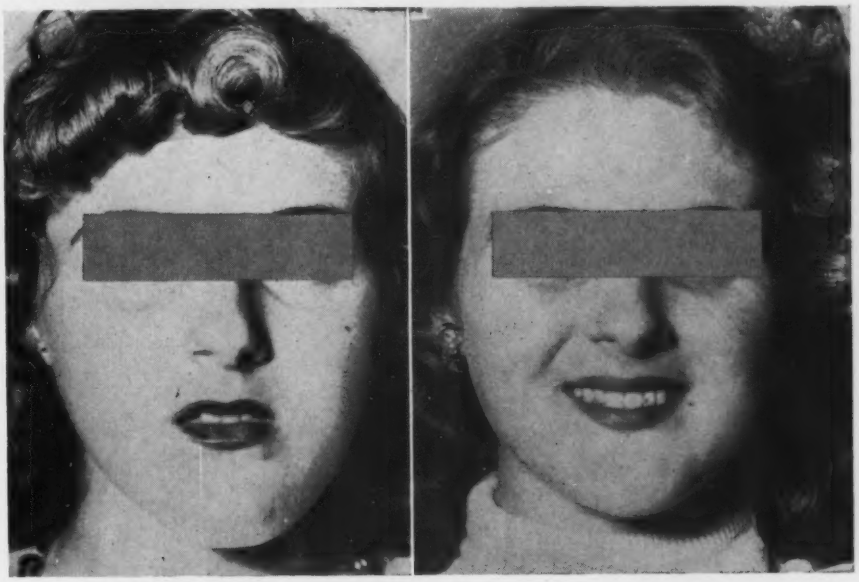
1. Fairly rapid healing.
2. Fixation discontinued in six weeks, no complicated appliances necessary.
3. No limit of correction.
4. The entire arch may be moved as a unit.
5. The procedure involves a simple cut through the bone with minimum danger to nerves and vessels.
6. Muscle pull following osteotomy aids in approximation of fragments.
7. Excellent procedure for edentulous patients.
8. May be used for correction of open-bite.

Disadvantages:

1. Surgical difficulty (minimal compared with vertical osteotomy or subsigmoid ostectomy).
2. Possible parotid fistula.

In the past two years we have performed nine operations for correction of prognathism or open-bite, as follows: subsigmoid ostectomy, three cases; bilateral body ostectomy, two cases; ramus ostectomy, one case; and subcondylar ostectomy, three cases. Complications resulted in three cases as follows:

Complication 1 (Open-Bite).—The patient, a 27-year-old white woman, was operated on for prognathism. The procedure performed was intraoral osteotomy according to the method of Sloan. The procedure was carried out satisfactorily on the left side; on the right side the ramus cut was made too close to the sigmoid notch, separating the coronoid from the condyloid process. In the ensuing weeks, the patient developed a marked open-bite which was not controlled by intermaxillary fixation. The patient refused nasal mandibular wiring. Subsequently, the open-bite was partially corrected by extraction of the mandibular molar teeth and alveolectomy.



A. *B.*

Fig. 4.—White girl, aged 17 years. The chief complaint, prognathism, corrected by means of subsigmoid ostectomy. *A*, Preoperative. *B*, Postoperative.

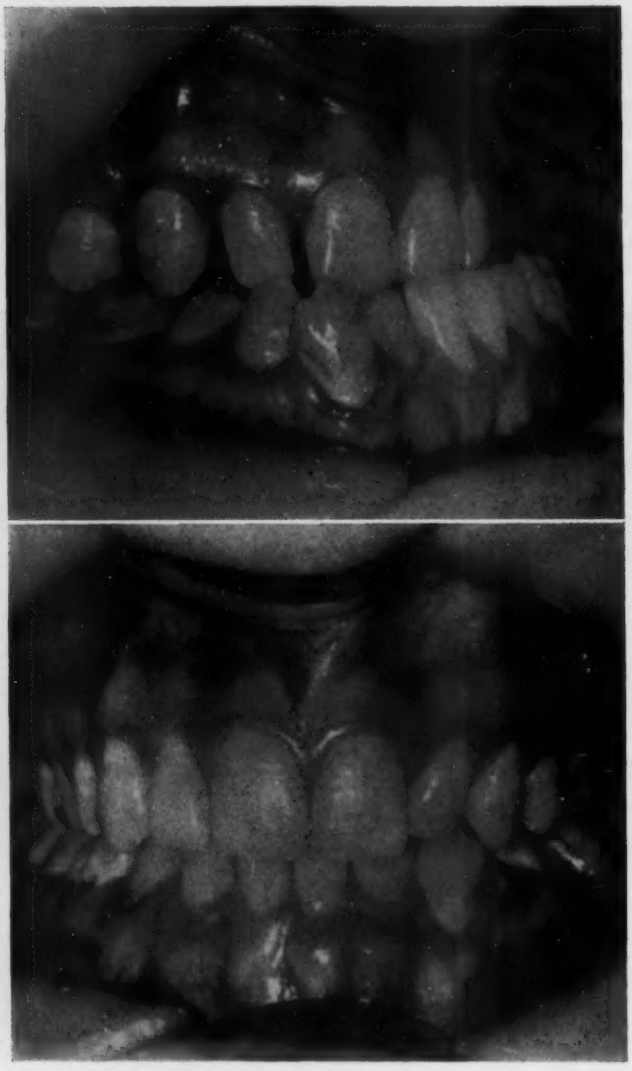
Complication 2 (Transient Open-Bite).—A white girl, aged 18 years, underwent a subsigmoid ostectomy for correction of prognathism. The procedure was uneventful on the right side. On the left side the ostectomy impinged on the coronoid process to such an extent that it was fractured and displaced. In the first two weeks following surgery the patient began to develop an open-bite. She was returned to surgery two weeks following the initial procedure. Nasal mandibular wiring was instituted; subsequent progress was uneventful and the result was excellent.

Complication 3 (Facial Paralysis).—A 17-year-old white girl was operated on for prognathism. The procedure used was subsigmoid ostectomy. Following surgery, there was a weakness of the muscles supplied by the right zygomatic branch of the facial nerve. This was transient, and six weeks following surgery there was no evidence of residual weakness.

DISCUSSION

Several procedures are in use today and probably vary in success according to the individual operator's experience and talents. There are certain indications for moving the body back as a unit and other indications for sectioning the body through the mandible. All cases should have careful study,

A.

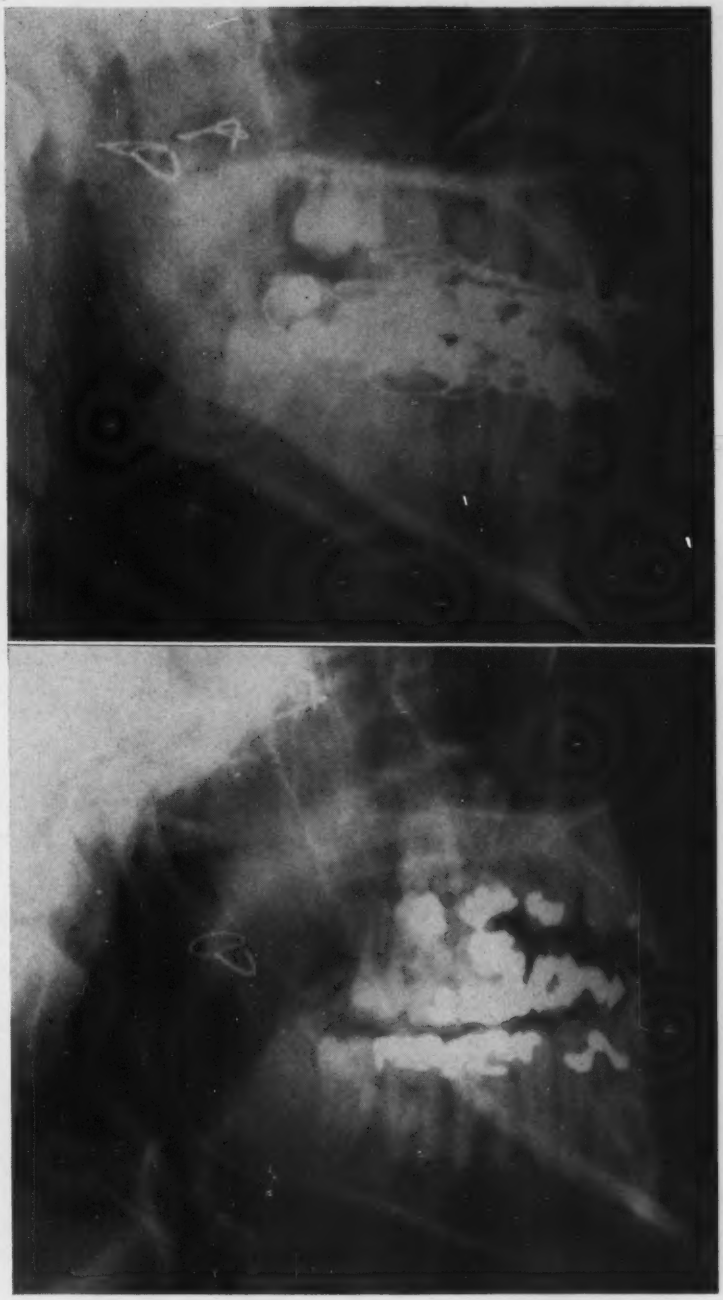


B.

Fig. 5.—Intraoral views of patient in Fig. 4. *A*, **Preoperative.** *B*. **Postoperative.**

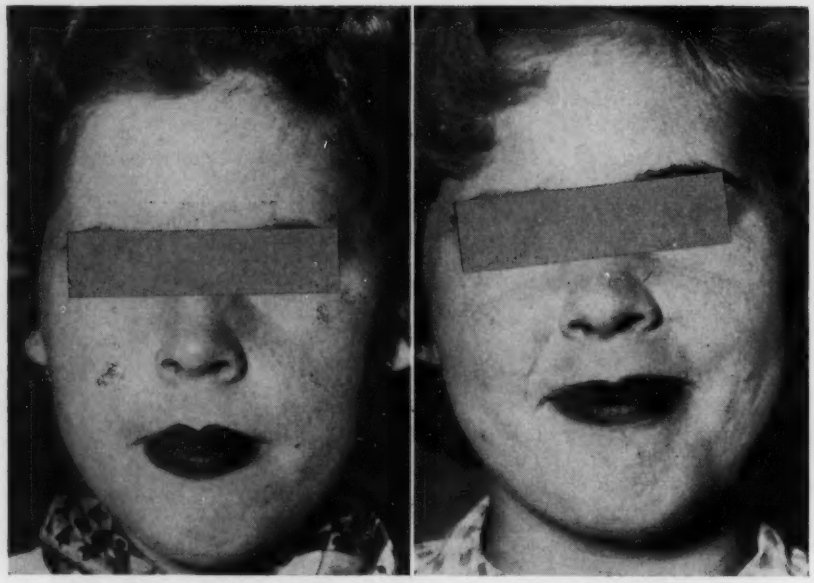
including cephalograms, study models, and photographs, prior to selection of the surgical procedure. Certain cases, due to pronounced elongation in the horizontal ramus, may be corrected only by resection in the body of the mandible. Open-bite is corrected very nicely by this same procedure, although

A.



B.

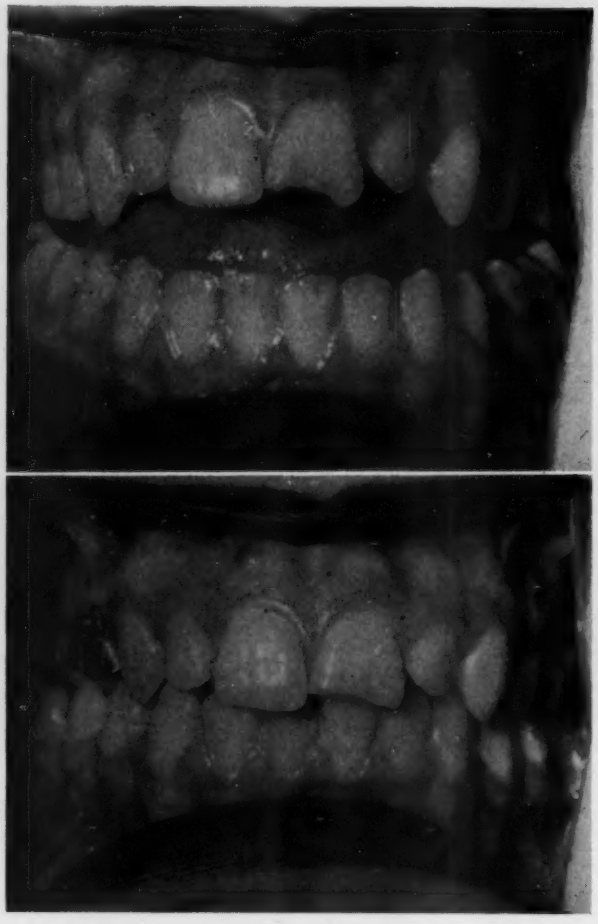
Fig. 6.—Lateral jaw roentgenograms of patient in Fig. 4. *A*, Immediately after surgery. *B*, Two years after surgery, showing complete reconstruction of ramus and condyle.



A. *B.*

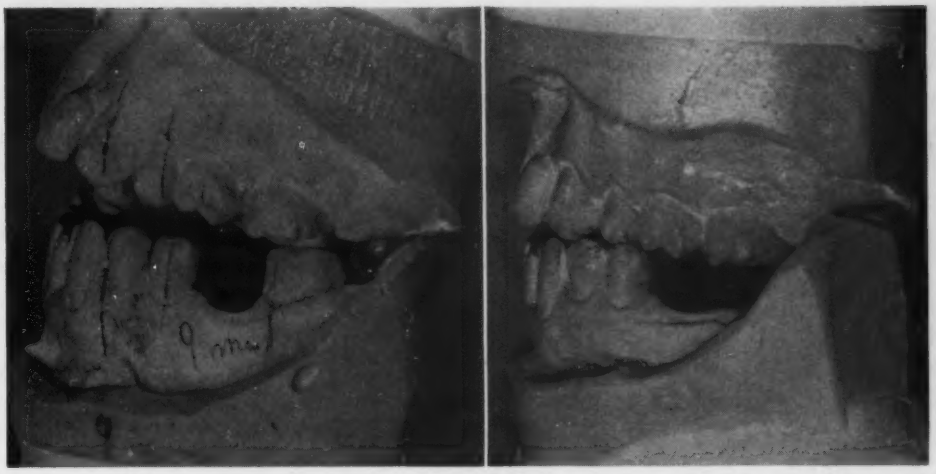
Fig. 7.—White girl, aged 17 years. Chief complaint, open-bite, corrected by bilateral ostectomy in the body of the mandible. *A*, Preoperative. *B*, Postoperative.

A.



B.

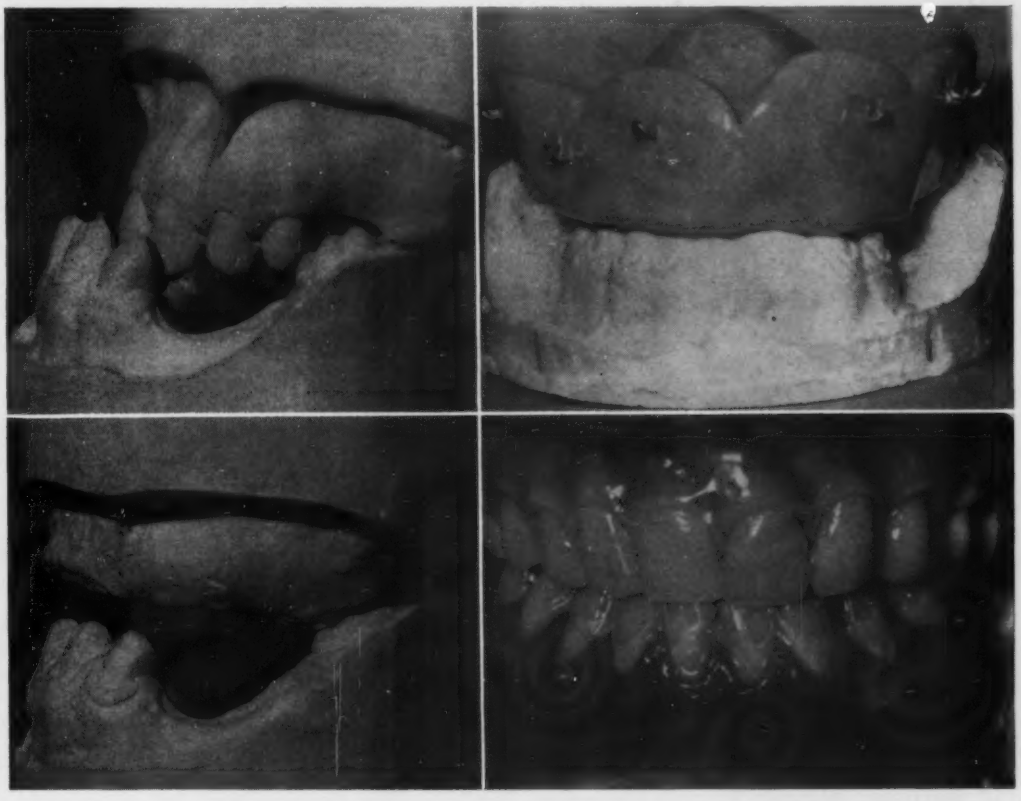
Fig. 8.—Intraoral views of patient in Fig. 7. *A*, Preoperative. *B*, Postoperative.



A. *B.*

Fig. 9.—*A*, Open-bite complicating ramus osteotomy for prognathism. *B*, Correction of open-bite by extraction of lower molars and alveolectomy.

A. *B.*



C. *D.*

Fig. 10.—White man, aged 21 years. Prognathism corrected by removal of four remaining maxillary teeth and bilateral subcondylar osteotomy. *A*, Preoperative models. *B*, Postoperative models. *C*, Splint used for postoperative fixation. *D*, Postoperative intraoral view.

Kostecka first reported subcondylar osteotomy for the correction of open-bite; this also may be a very suitable method for correction of this type of malocclusion. Fixation problems are greater when the ramus osteotomy and the bilateral body ostectomy procedures are performed—in the first, because of the tendency to open-bite and, in the second, because of the tendency to nonunion (for this reason, the fixation in the latter procedure is best carried out by orthodontic appliances). Fixation with subcondylar osteotomy, subsigmoid ostectomy, and the vertical osteotomy are comparatively simple matters and may be done with arch bars and intermaxillary fixation, as in fractures. In certain instances where the teeth are not adequate or where, for some reason, an open-bite may be developing, fixation may be secured quite satisfactorily by means of nasal mandibular wires. This probably will even prevent the development of open-bite in cases where the ramus osteotomy is performed. In edentulous patients correction is easily achieved without undue difficulty by means of the subcondylar osteotomy.

SUMMARY

A brief historical review of the development of the management of Class III malocclusion has been presented. Success with various techniques depends not only upon the needs of the individual case, but also upon the experience and ability of the operator. There are advantages and disadvantages with each procedure, and these should be considered carefully prior to selecting the surgical procedure. Nine cases have been operated on within the past two years with good results; three complications occurred and are presented.

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CURRENT CONCEPTS AND CLINICAL APPLICATIONS OF THE EDGEWISE ARCH MECHANISM

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INTRODUCTION

THIS introduction must be brief, for it is my purpose to emphasize the major variations in techniques which exist among clinicians who use the same types of appliances. The basic principles underlying the current concepts and clinical applications of the edgewise arch mechanism, however, necessitate a discussion of the evolution of this type of mechanotherapy.

In June, 1925, Edward Hartley Angle presented "The Latest and Best in Orthodontic Mechanisms" at the fourth annual meeting of the Edward H. Angle Society. It was not until 1928 that it was published in the *Dental Cosmos.*[1] Frederick B. Noyes, a colleague of Angle, in his "Lessons From Twenty-five Years of Orthodontic Practice,"[2] wrote an interesting description of the evolution of the edgewise arch mechanism. He observed that ". . . with each change in technique there has been more or less development in fundamental concepts." Angle maintained a fixed principle regarding ideal occlusion. This meant the establishment of normal cuspal antagonism and contact relation of all permanent teeth.

Angle adhered firmly to his ideal, and this was a basic objective of all his appliance therapy. In 1909, his "E" round arch wire, with threaded ends and nuts fitting into round tubes on molar clamp bands, was the appliance of choice used universally by students of Angle. Intermaxillary elastics, credited by Angle to H. A. Baker, were used in the correction of arch relation in Class II, Division 1 malocclusions.[2] The need for more definite control of individual teeth became evident; he then developed the pin and tube appliance in 1911.[2] Although this appliance satisfied many of the needs for three-dimensional control of all the teeth, the construction and application were quite difficult and time consuming; hence, it was not used widely. The pin and tube mechanism was followed by the ribbon arch wire and attachments which "inaugurated radical changes in concepts of anchorage." The bands for the ribbon arch were placed generally on the six anterior teeth. Ligatures were eliminated; instead, pins were used to retain the ribbon arch. However, there was no control of the premolars.

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Angle recognized this inadequacy and developed, as stated above, the edgewise arch mechanism. All the teeth except the anchor molar teeth had bands with edgewise brackets attached to engage a rectangular arch wire; the largest diameter was in the horizontal plane as opposed to the ribbon arch, wherein the largest diameter was in the vertical plane. Further, the molar tubes were rectangular, 0.022 by 0.028 inch in internal diameters, differing from the curvillinear tubes used with the ribbon arch wire. Complete engagement of an arch wire, of course, is an essential requisite. In the edgewise bracket, the labial or buccal contact is supplied by ligatures. Thus, Angle had to return to the use of ligatures, which he discarded with the use of the ribbon arch technique.[2]

The response to this appliance by the followers of Angle was mixed. Strang and other ardent followers of Angle at first resisted the return to the use of ligatures. However, they soon recognized the advantages of the new mechanism, and its acceptance became complete by Strang and many other clinicians.[3]

Although Noyes wrote, "... ideal form ... should be guided by the architectural plan of the individual," it is interesting to note that from that time to the present there has been, and still exists, considerable difference of opinion as to what is meant by the "architectural plan of the individual." This is quite understandable, for although Angle had in his mind a concept of balance and harmony which included the retention of all permanent teeth in ideal relation to their fellows in the same arch and their antagonists in the opposing arch, there was not yet developed the knowledge obtained from the studies of growth and development, from cephalometrics and other studies. Therefore, at present there are clinicians who use the same mechanotherapy, namely, the edgwise arch mechanism, of whom some believe that lateral development or expansion of the dental arches is impossible, except to a minor degree, and others insist that the "ideal architecture" implies expansion of the dental arches.

This difference of opinion involves the widely divergent positions of clinicians relative to the extraction of dental units. For example, Angle preaching as he did the full complement of teeth, "... expressed his opinion of the requirements of treatment by first creating an archwire that corresponded to the malocclusion ... passively ... and then, by a series of delicate adjustments, removed the irregularities."[4] This implies, of course, that the arch was increased in size by lateral and often anterior expansion. On the other hand, Nance[5] and Strang,[6] after examining their treated cases years after retention had been discontinued, found that they could not maintain, except in isolated cases, any lateral development which had been obtained by an increase in arch dimensions.

I have no desire to evaluate the different techniques and philosophies of clinicians using the edgewise arch mechanism. My appliance of choice is

the edgewise arch mechanism. I find, however, that as a result of current studies and experience, my own concepts must be changed to conform to clinical data derived from various studies.

It has been stated that Angle adhered strictly to the full complement of teeth. It should be added, however, that this stems from his publications in the seventh edition of his *Treatment of Malocclusion of the Teeth.*[7] It should be noted that in the sixth edition, published in 1900, Angle was not averse to the extraction of teeth.[8] Also, Case,[9] a contemporary of Angle's, advocated extraction of teeth in bimaxillary protrusion. George Grieve,[10] another of Angle's contemporaries, also had dental units extracted in many of his cases. Neither Case nor Grieve used the edgewise arch mechanism.

ANGLE PLAN OF TREATMENT OF CLASS II CASES

According to Strang,[11] in his later years Angle advocated the following plan of treatment for Class II cases, using the edgewise arch mechanism:

1. "Establish stationary anchorage on the mandibular arch and guard this zealously . . . to prevent labial tipping of the lower incisors and mesial axial perversion" of the lower posterior teeth. "Stationary anchorage automatically appears in the mandibular denture with bracket engagement of these teeth," and can be ". . . increased by slight local distal tipping bends" in the posterior teeth.
2. Move the maxillary posterior teeth ". . . distally until normal, inclined plane relationships with the mandibular dental arch units are established."
3. "Correct the infra- and supraocclusion of the various arch units . . ."
4. "Effect general arch growth . . .," and "re-establish normal growth, functional activity and muscular balance and harmony in all the associated tissues." According to Angle's philosophy, these physiologic requirements are all natural sequelae when the other technical procedures have been fulfilled in a healthy, habit-free person.

Charles H. Tweed, a close disciple of Dr. Angle, after following carefully and in great detail the teachings of Angle as Tweed understood them, arrived at the conclusion that he had increased arch length with a resultant exaggeration of the fullness in the profile. He re-treated a very large percentage of his patients by extracting four first premolars[12] as an important part of his treatment plan. He developed a precise technique for obtaining his objectives. First of all, Tweed believed that the mandibular incisors had to be "upright" in the mandibular arch. This often necessitated a lingual retraction of these teeth. Second, Tweed quickly discarded the idea of lateral expansion of the dental arches and accepted the dental arch form of the patient with its malocclusion as the final form after treatment. Obviously, then, when teeth were crowded or protruded in a dental arch, relief had to be obtained by extraction of dental units to align properly the remaining teeth within an established amount of bony support.

Currently, there are men who have joined forces with Tweed and have similar objectives, but who approach their objectives by somewhat different methods of treatment. It may be interesting at this point to describe briefly Dr. Tweed's present objectives and method of treatment and those of others who may be considered as having followed the original principles of Tweed but who are varying their mechanotherapies somewhat. These are: (1) the Bull technique and (2) the Northwest technique.

It should be emphasized that all three methods just mentioned, that is, Tweed's method and the two variations, have within themselves inherent differences which vary with the operator. This article will deal primarily with the essentials of the methods, rather than with the variations within each one of them.

THE BULL TECHNIQUE

The philosophy of Harry Bull is best understood by a study of his procedures in the treatment of a Class II, Division 1 malocclusion.[13] Quoting Krogman, Bull has stated: "... about 5 per cent of Class II, Division 1 cases treated orthodontically (following the usual procedures which do not involve extraction of teeth and which require the wearing of Class II elastics) arrive at a successful outcome."

Some basic concepts underlying Bull's treatment procedures are as follows:

1. Mandibular repositioning is largely a myth.
2. An undisturbed tooth is the best source of anchorage.
3. Basal bone is completely unaffected by the movement of superimposed dental units.
4. Gross changes of the inclination of the mandibular incisors are unnecessary.
5. Uprighting of buccal dental units is a necessary prerequisite of treatment.
6. A definite limit of activation ("thickness of a thin dime") at three-week intervals approaches a physiologic tolerable limit. Excessive and too-frequent activation can radically disturb the resistance balance between dental units affected by opposing mechanical forces. Sectional arch wires utilizing second molars are quite adequate to obtain distal movement of canines and initial forward movement of molars.
7. The proper procedure for the correction of a Class II, Division 1 malocclusion must rely chiefly on tooth movements for the correction of arch relationships "without putting such heavy demands upon anchorage."
8. A maxillary Hawley appliance is effective for the removal of occlusal interferences.

Technical Procedures in the Bull Technique.—The procedure in treatment of a Class II, Division 1 malocclusion is described briefly. After the extraction of the mandibular first premolars, a sectional arch wire is inserted into

the unleveled buccal segments of that arch, extending from canine to second molar (Fig. 1, *A*). It has some leveling affect upon the posterior teeth. A maxillary Hawley appliance is worn to remove occlusal interferences. By controlled activation, with the Bull loop (vertical, closed loop) opened to the thickness of a thin dime, canines are retracted bodily only sufficiently to align the lower incisors (Fig. 1, *B*). With the canine bands removed, the lower incisors are retracted and aligned on an 0.021 by 0.025 inch rectangular arch wire. Mild tip-back bends are used to upright the teeth in the posterior segment (Fig. 1, *C*).

Following the retraction of the mandibular canines and uprighting of the posterior teeth, the maxillary first premolars are extracted and sectional arches are inserted in the maxillary buccal segments. Class II elastics are then used (Fig. 1, *D*) (1) to retract the maxillary canines and (2) to move the mandibular molars and premolars anteriorly.

After the maxillary canines have been retracted, the incisors are banded, leveled, and retracted, first with round and then with rectangular arch wires (Fig. 1, *E*). The axial inclination of the maxillary incisors is carefully maintained by lingual root torque incorporated in the rectangular arch wire. Thus, the retraction of the maxillary canines and anterior teeth, is accomplished concomitant with forward movement of the lower posterior teeth. This is an important consideration in treatment, since the activation of the Bull loop in the mandibular arch in conjunction with the use of Class II elastics accomplishes three objectives, namely, (1) retraction of maxillary incisors, (2) forward movement of the mandibular posterior teeth, and (3) maintenance of position of the mandibular incisors.

Some explanation of the last objective (namely, the maintenance of the position of the mandibular incisors when the mandibular arch is subjected to Class II intermaxillary elastics) is in order. Obviously, if the extraction spaces had been completely closed during space closure, the mandibular incisors would be affected by the forward pull of the elastics. However, Bull makes a very important point of the fact that in closing the spaces created by the extraction of the mandibular first premolars he does not exceed two-thirds of the spaces created by the extraction. Then, with stops on the arch wires about 1.5 mm. anterior to the molar tubes, the arch wires are cinched back by steel ligatures ligated to the end of the arch wires. This creates a lingual or posterior pressure on the incisors and is counteracted by the anterior force of the intermaxillary elastics. Thus, there is no resultant anterior pressure on the incisors from the Class II elastic force. This reciprocal force between incisors and molars is possible only when there is a residual space between the canines and second premolars (Bull's "strategic space").

In a large measure, then, Bull's treatment has been based initially upon Tweed's primary objectives, namely, the utilization of existing basal bony support and the maintenance of the original arch width of the malocclusion. The essential differences lie in (1) the degree to which the mandibular canines and incisors are retracted and (2) the manner in which the posterior segments

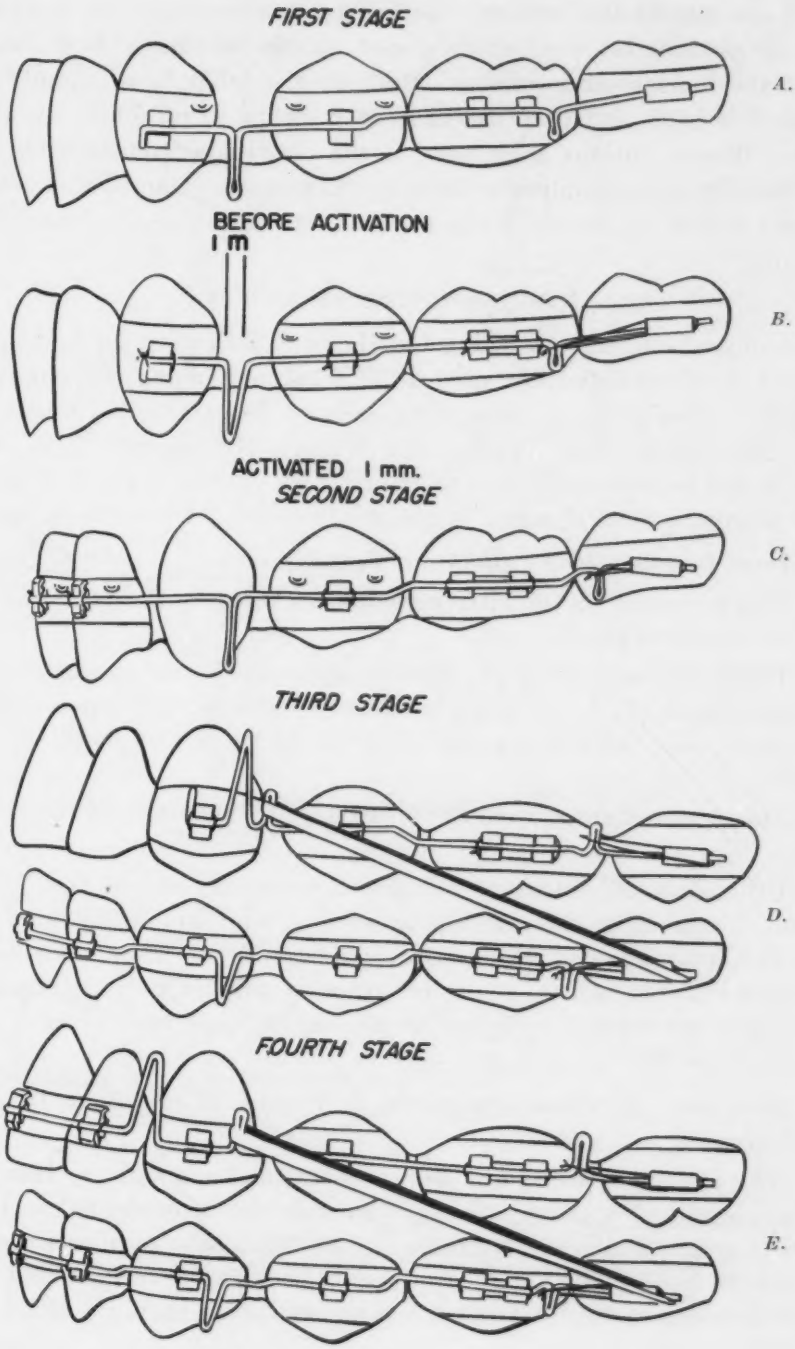
FIRST STAGE
A.
BEFORE ACTIVATION
1 m
B.
ACTIVATED 1 mm.
SECOND STAGE
C.
THIRD STAGE
D.
FOURTH STAGE
E.

Fig. 1.

of the mandibular arch are treated. According to Tweed, the posterior segments are uprighted and then tipped further distally to establish "toe hold" and the six mandibular anterior teeth are retracted until the spaces caused by the extractions are completely closed, chiefly by lingual and distal movement of the incisors and canines. Bull, on the other hand, simply uprights the posterior teeth and then moves them forward to establish a Class I relationship. Tweed obtains anchorage of the entire mandibular arch, and Bull uses primarily intramandibular forces; that is, the mandibular buccal segments are moved anteriorly, while the maxillary anterior segments are moved posteriorly.

THE NORTHWEST TECHNIQUE

A group of clinicians working together and following the basic principles of Tweed developed another method of treatment using the edgewise arch mechanism. This group consisted originally of the late Milton Fischer, Emery Fraser, Paul Lewis, Peter Bishop, and William McGovern. These clinicians, located in the northwestern part of the country (in the State of Washington), have developed a method which is commonly called the Northwest technique.[14]

Current Concepts of the Northwest Technique.—

1. Extraction of the maxillary premolars prior to the complete eruption of the maxillary canines.

2. Utilization of a maxillary Hawley appliance to accomplish: (a) initial distal movement of the erupting maxillary canines; (b) release of occlusal interference; and (c) maintenance of the stability of the maxillary posterior segments.

3. Distal movement of mandibular canines by means of an intercanine coil spring.

4. Utilization of extraoral headgear, commonly called the "Northwest headgear," applied to the mandibular arch to maintain stability of that arch during the application of intermaxillary elastic force. Thus, there is obtained a constant and continuous posterior pressure against the maxillary canines, as well as a restraining influence on the mandibular arch derived from this extraoral force.

"Northwest" Technical Procedures in Treatment of a Class II, Division 1 Malocclusion.—

1. The four first premolars are extracted and a maxillary Hawley appliance is inserted (Fig. 2, *A*). Finger springs are incorporated in this appliance to engage the mesial surfaces of the maxillary canines exerting very slight distal forces (Fig. 2, *B*). As stated previously, the Hawley appliance also removes occlusal interferences and maintains the stability of the posterior segments.

2. The mandibular molars, second premolars, and canines are banded. Starting with a round 0.016 inch stainless steel arch wire and increasing the sizes of subsequent arches, these segments are leveled with an 0.021 by 0.025 inch rectangular arch wire (Fig. 2, *C*).

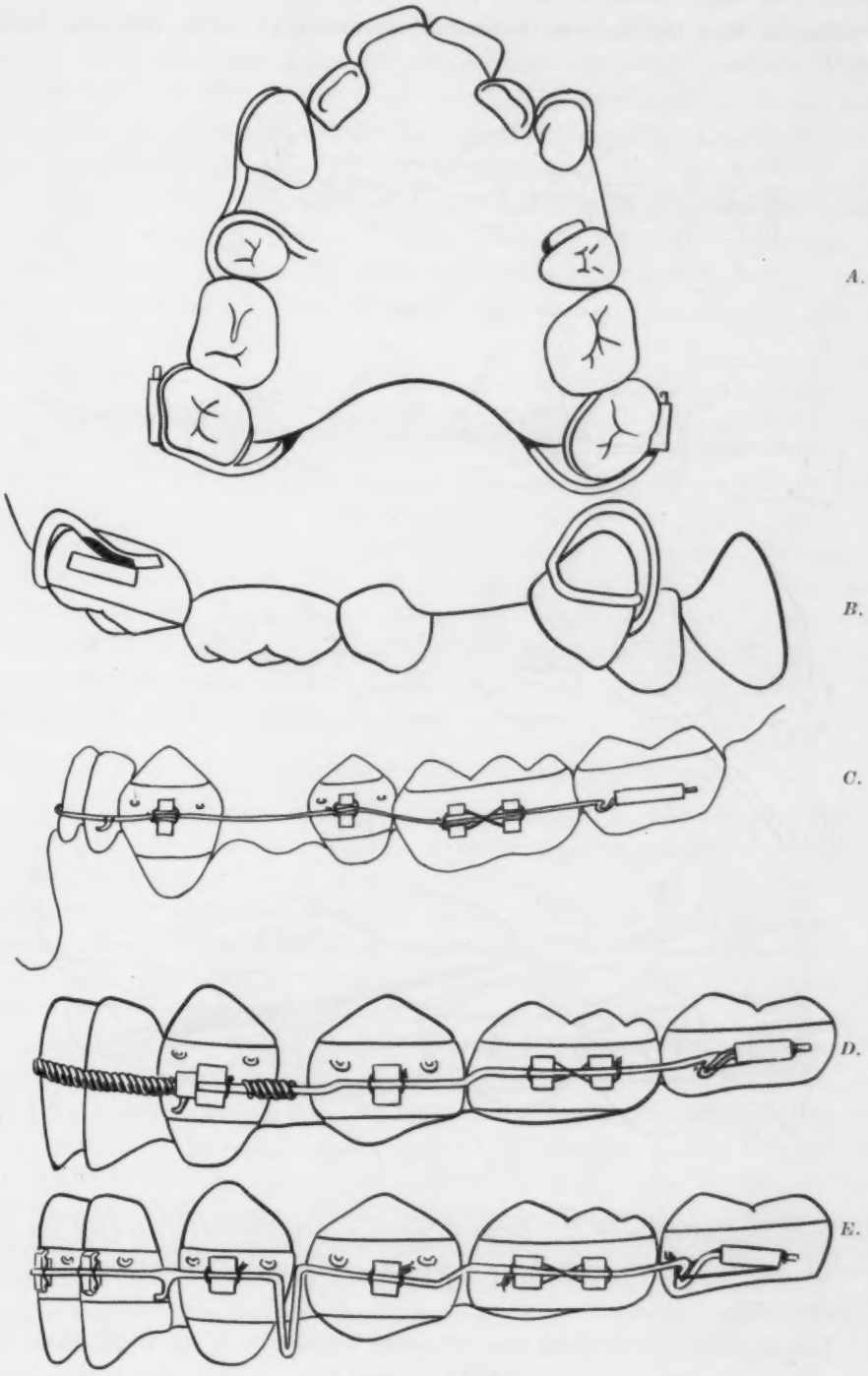

Fig. 2, *A* to *E*.

3. Distal movement of the canines is effected by intercanine coil springs. It will be noted that this differs from the Bull technique in that continuous arch wires are used throughout the distal movement of the mandibular canines (Fig. 2, *D*).

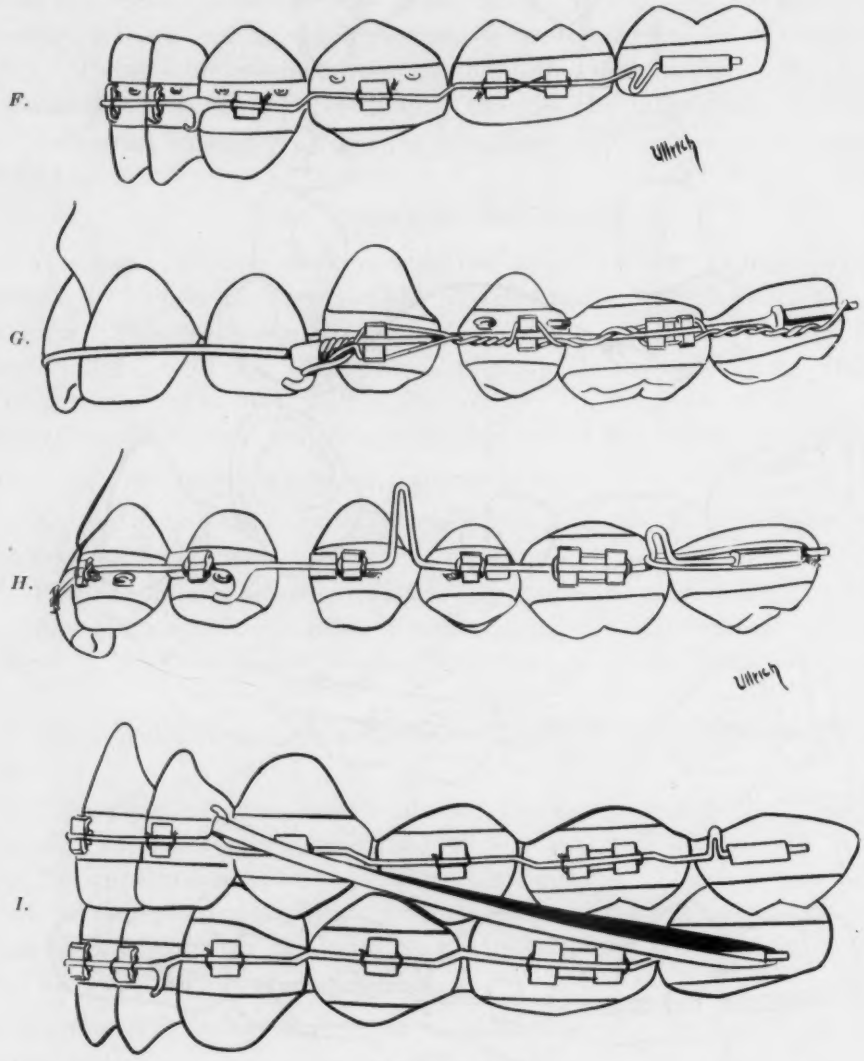

Fig. 2, *F* to *I*.

4. Mandibular incisors are banded when space has been created by distal movement of the canines, and leveling is continued throughout the entire mandibular arch.

5. The mandibular incisors are retracted by means of an 0.020 inch round arch wire incorporating closed (Bull) loops (Fig. 2, *E*). Anchorage is now established by a Northwest headgear directly against the mandibular arch (Fig. 2, *F*).

6. The maxillary Hawley appliance is removed, and the maxillary molars, premolars, and canines are banded and leveled. An 0.021 by 0.025 inch arch wire is inserted and, if necessary, the maxillary canines are moved further distally. This is accomplished by coil springs compressed between a sliding hook on the arch wire, distal to the lateral incisor, and the canine bracket. Either Class II elastics or a headgear applied directly to the maxillary arch, or both, reinforce this action (Fig. 2, *G*).

7. The maxillary incisors are banded and retracted initially by means of an 0.020 inch round arch wire with closed loops. If bodily retraction of the incisors is desired, an 0.021 by 0.025 inch rectangular arch wire is used, incorporating lingual root torque. Class II elastics are a necessity in this phase of treatment (Fig. 2, *H*).

8. The headgear is worn at night, applied against the mandibular arch, and Class II intermaxillary elastic force is continued until a Class I relationship has been established (Fig. 2, *I*).

It might be well to point out that the objectives of the Northwest technique do not vary to any large degree from those originally suggested by Tweed. However, there are some differences in treatment with regard to: (1) time of extraction of teeth; (2) the application of the maxillary Hawley appliance; (3) the distal movement of the mandibular canines by means of coil springs; and (4) the reinforcement of the mandibular arch by extraoral forces during the establishment of anchorage and the development of Class I relation of the dental arches.

RECENT DEVELOPMENTS IN TWEED CONCEPTS

As stated previously, the two methods described, namely, the Bull technique and the Northwest technique, have as their fundamental objective the original principles of Tweed, with the exceptions as noted. Starting with the concept of the "upright" incisors, Tweed then used the incisor-mandibular angle first described by Margolis[15] on the standardized Roentgen cephalogram concerning the relation of the mandibular incisors to the mandibular plane. In effect, Margolis[15] stated that in the standardized sagittal cephalogram the long axis of the mandibular incisor formed an angle of 90 degrees ± 3 degees with the mandibular plane, in the balanced facial skeleton and in the orthognathic profile. Later, Tweed[16] related the mandibular plane to the Frankfort horizontal plane and established the Frankfort-mandibular angle. Originally, he obtained this angle directly from the face. Now he obtains this and other criteria from standardized sagittal cephalograms. He assessed the facial skelton in the vertical dimension from the data he obtained in the ranges of this angle and related his observations to treatment planning and prognosis. His range for a normal facial pattern is a Frankfort-mandibular plane angle of from 16 to 28 degrees. When the Frankfort-mandibular plane angle is from 28 to 35 degrees, the growth proportions are not quite favorable. When the angle is 35 degrees or greater, then the prognosis for the improvement of facial esthetics as a prime objective is poor, according to Tweed.

More recently, by the use of cephalometrics, Tweed has introduced the Frankfort-mandibular incisor angle (FMIA).[19] This is constructed by continuing the long axis of the mandibular central incisor on the sagittal plane superiorly, until intersection is made with the line formed by the Frankfort plane as described in the cephalogram. For the Frankfort plane, Tweed connected "a point 4.5 mm. above geometric center of the ear rod" (porion) "with the lower border of the orbit" (orbitale).

The FMIA and its application constitute Tweed's latest concept in orthodontics. Tweed has, as one of his major basic objectives in treatment, the attainment of an FMIA of 65 degrees. This is his angular expression of an upright incisor, and is an anatomic position that best represents the stability and esthetics that he wishes to achieve.

KESLING DIAGNOSTIC METHOD[18]

As a diagnostic aid in treatment of crowded and protrusive dentitions, the Kesling "setup" of the plaster models, correlated to the FMIA, is used by Tweed, Kesling, and others. On the lateral cephalogram, a dotted line is drawn from the apex of the mandibular incisor to form an angle of 65 degrees with the Frankfort horizontal plane. This is the starting point of the Kesling diagnostic setup, and the mandibular incisor must generally be moved lingually to that position. The exact number of millimeters of lingual positioning is determined from the lateral cephalogram by measuring the horizontal distance between the dotted line and the incisal edge of the mandibular incisor. The remaining dental units are aligned laterally and posteriorly, and either available or insufficient space in the dental arch is thus determined directly from the models. Care is necessary to maintain the original arch width.

TECHNICAL PROCEDURES IN THE TWEED TREATMENT OF A CLASS II, DIVISION 1 MALOCCLUSION[19]

Complete Dentition

1. *Leveling.*—All four first premolars are extracted and all teeth are banded. If anterior crowding is severe, at least two of the four incisors are banded, 0.018 inch leveling arch wires being inserted in both arches (Fig. 3, *A*). These arch wires contain tie-back stops to maintain arch length and tip-back bends in the buccal segments to begin uprighting of the posterior teeth. The tip-back bends in the terminal molar tubes are somewhat exaggerated. If necessary, a headgear is attached to the maxillary arch throughout treatment and is worn fourteen hours a day.

2. *Uprighting of Canines.*—Rectangular arch wires, 0.019 by 0.026 inch, with mild tip-back bends are inserted in both arches. Horizontal loops, 0.019 by 0.026 inch, are soldered to the arch wire just mesial to the second premolars, and a staple is attached (soldered or welded) to the anterior end of the loop (Fig. 3, *B*). A ligature is tied from this point to the distal staple on the canine band to upright the canine. The canine bracket is not engaged in the arch wire.

3. *Preparation of Anchorage in Buccal Segments.*—An 0.0215 by 0.027 inch maxillary stabilizing arch wire with mild tip-backs and an 0.019 by 0.026 inch mandibular working arch wire with sliding yokes to bear pressure against the brackets of the second premolar teeth are inserted (Fig. 3, *C*). Class III elastics are used, as tip-backs are inserted into the mandibular arch. The mechanics are then reversed and an 0.0215 by 0.027 inch mandibular stabilizing and 0.019 by 0.026 inch maxillary working arch wire with sliding yokes are inserted. Class II elastics are then used to tip back the maxillary posterior teeth (Fig. 3, *D*).

4. *Distal Movement of Canines.*—Maxillary and mandibular arch wires, 0.019 by 0.026 inch, are inserted (Fig. 3, *E*). These contain open coils compressed mesial to the canines to obtain distal movement. Class III elastics reinforce distal movement of the mandibular canines while a headgear is applied to the maxillary arch wire. Identical tip-back bends are inserted in these and all subsequent arch wires.

5. *Distal Movement of Incisor Teeth.*—Arch wires, 0.019 by 0.026 inch, with closed Bull loops distal to the canines, initiate retraction of the incisor teeth (Fig. 3, *F*). The incisors are slowly retracted by activating (opening) a vertical closed Bull loop the "thickness of a thin dime" every third week. The mandibular incisors are retracted to an FMIA of 65 degrees in Class I and 70 degrees in Class II cases. If "rabbiting" of maxillary incisors is a problem, the operator must continue maxillary retraction upon a heavier 0.0215 by 0.027 inch rectangular arch wire containing coil springs (Fig. 3, *G*). Strong lingual root torque is incorporated in the maxillary incisor segment of the arch wire to obtain bodily distal movement. To reduce friction, the arch wire is anodized posteriorly to 0.019 by 0.026 inch, and is fashioned to pass labial to the canine brackets. Stops are soldered on the arch wire 3 mm. mesial to the second premolar bracket. Coils are compressed against these stops by means of ligatures that are laced to the entire posterior segment by means of a figure-of-eight tie.

6. *Correction of Class II Relationship.*—If the dentition still presents a Class II relationship following space closure in both arches, a mandibular stabilizing arch wire, 0.0215 by 0.027 inch, and a maxillary working arch wire, 0.019 by 0.026 inch, are inserted (Fig. 3, *H*). Both arch wires contain accentuated tip-back bends, and the mandibular arch wire is tied back to receive Class II elastics. The terminal end of the maxillary arch wire is not tied back, and hooks are soldered mesial to the maxillary canines. Class II mechanics is continued until normal cuspal relationship is achieved.

7. *Detailed Finishing of Both Dental Arches.*—For final space closure and detailed tooth positioning, 0.019 by 0.026 inch maxillary and mandibular ideal arch wires are formed and superimposed before insertion. Coil springs are compressed against stops 2 mm. mesial to the second molar tubes until space closure is completed (Fig. 3, *I*). Vertical elastics are used to seat cusps anteriorly or posteriorly if any bite-opening exists.

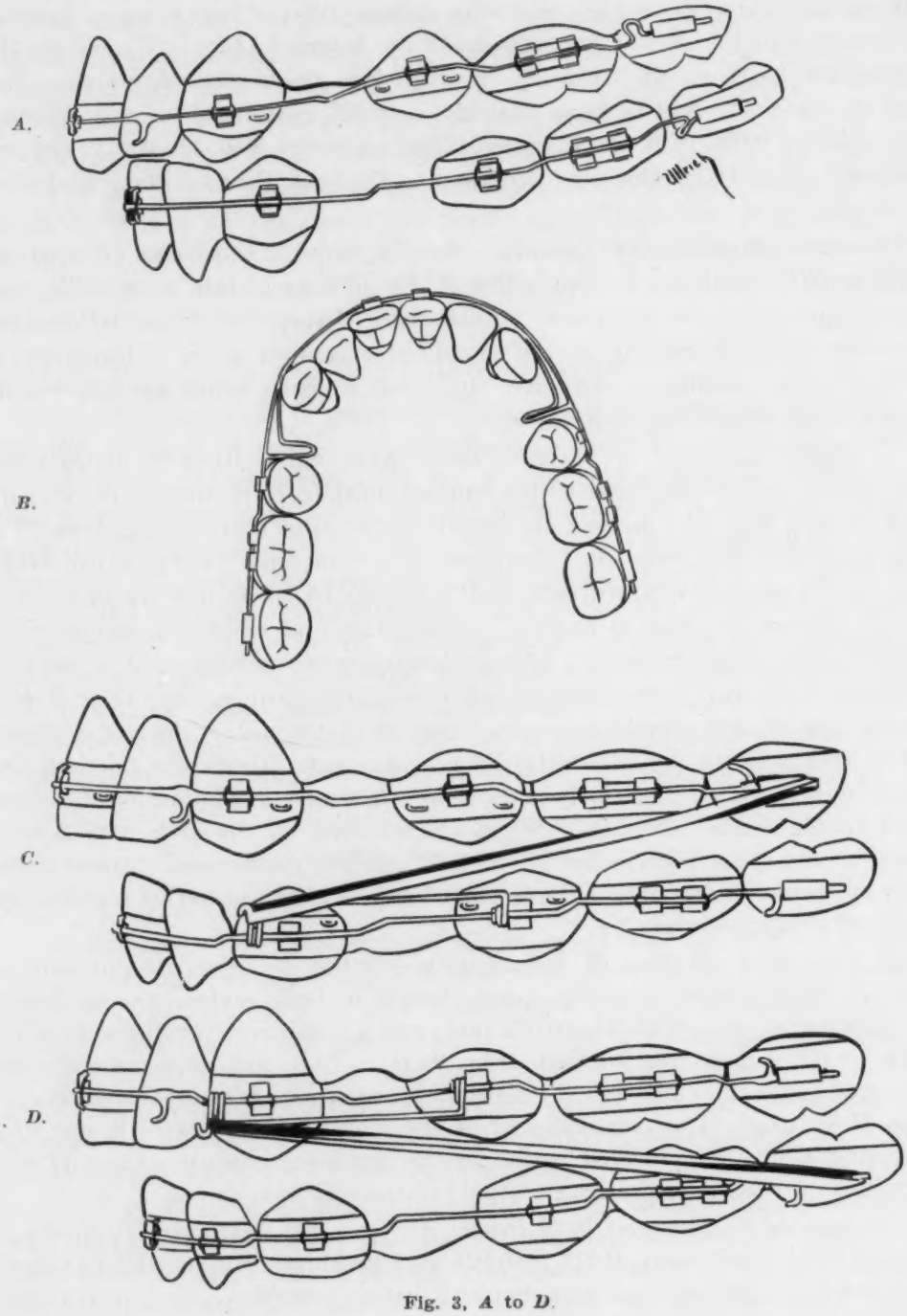

Fig. 3, *A* to *D*.

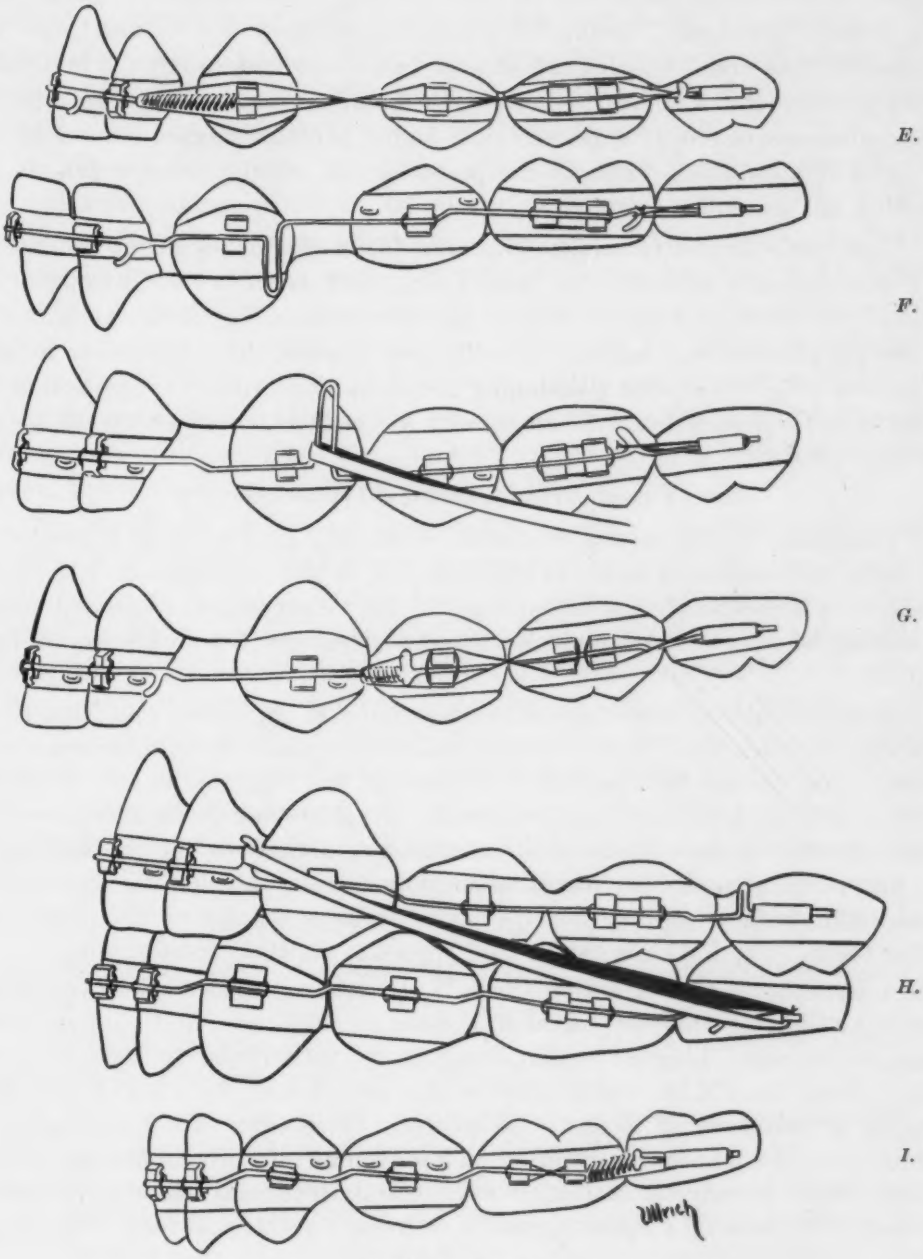

Fig. 3, *E* to *I*.

A cardinal consideration in the Tweed treatment is the establishment and maintenance of anchorage, whenever necessary, in both the maxillary and mandibular arches. According to Tweed, teeth in distoaxial inclination have greater resistance to displacement than mesially inclined units. These "tipping" and "distoaxial" inclinations are effected early in treatment, and are constantly reasserted to gain the utmost in posterior stability. It is applied at many intervals of therapy—before the distal movement of canines, before the lingual movement of anterior teeth, and if necessary again before the use of Class II mechanics. This is the procedure to which Tweed refers as the creation of "toe hold."

Case analysis and treatment planning focus sharply upon the inclination of the mandibular incisors. As Strang says, they seem to have "usurped the throne" of the first molars. Tweed has borrowed a leaf from the notebook of the prosthodontist, and has insisted upon placing the mandibular incisors "over the ridge." If such positioning is not possible with the retention of the basic arch form and the full complement of teeth, extraction of teeth is then recommended.

Tweed Mixed Dentition Treatment

Treatment in the mixed dentition, according to Tweed, is indicated to intercept malocclusions at an earlier stage of dental development. If, in the analysis, it is indicated that extraction will not be necessary, treatment should be started as soon as the four incisors and first molars in both arches are fully erupted.

A nonextraction procedure is recommended in the mixed dentition if the analysis discloses, first, that available space approximates required space and, second, that at the termination of treatment the FMIA will not exceed 62 degrees with satisfactory facial esthetics. Available space is determined by measurements on each tooth in the mandibular arch from the median line to the first permanent molar. Required space is calculated from the four erupted mandibular incisors and intraoral x-ray pictures of the lower canine and premolar teeth. The FMIA is determined from the sagittal cephalogram.

A hypothetic nonextraction Class II, Division 1 malocclusion would present the following analysis: Available space totals 67 mm. and required space measures 63 mm. Lingual repositioning of the mandibular incisors, as determined from the FMIA, would shorten the arch length by a total of 6 mm., leaving a deficiency of 2 mm. To prevent extraction, this 2 mm. must be obtained in the mixed dentition by distal tipping of the mandibular anchor molars (first permanent molars). Such distal tipping is achieved primarily by means of Class III elastics against a maxillary arch reinforced with a headgear.

Treatment of extraction cases should be delayed until approximately fifteen months prior to the eruption of the second premolar and second molar teeth. Available and required space are determined as previously, and the FMIA is determined from the sagittal cephalogram.

A hypothetic extraction case would present the following analysis: Available space totals 72 mm. and required space totals 76 mm. The FMIA is 53 degrees, indicating that the mandibular incisors must be tipped lingually 12 degrees to secure an FMIA of 65 degrees. This is equivalent to a total shortening of arch length of 10 mm. By subtracting 10 from 72, we arrive at a total available space of 62 mm. Thus, there is a discrepancy of 76 minus 62, or 14 mm., indicating an extraction case of a severe nature, since the widths of the two lower first premolars total approximately 16 mm.

In the extraction case, the first deciduous molars and first premolar buds are extracted along with the maxillary deciduous canines. The incisors, second deciduous molars, and first permanent molars are banded. Arch wires, 0.018 inch, are inserted in both arches to obtain leveling, and a headgear is applied to the maxillary arch. Class III elastics are used to tip the mandibular anchor (first) molars distally and aid in the retraction of the mandibular incisors. The incisors are retracted on an 0.019 by 0.026 inch mandibular arch wire containing closed (Bull) loops until an FMIA of 70 degrees is obtained, or until there is only 1 mm. in excess of space required to accommodate the canines and second premolar teeth.

The maxillary incisors are retracted to a vertical position upon an 0.019 by 0.026 inch arch wire containing lingual root torque in the incisor segment and closed loops in the extraction area. When the maxillary incisors are in a vertical inclination, an 0.0215 by 0.027 inch arch wire containing strong lingual root torque in the incisal area is inserted. Stops are soldered 3 mm. anterior to the second deciduous molars. The posterior segment of the arch wire is reduced in the anodizer and coils are compressed against the stops by means of ligatures tied to the posterior teeth until final retraction is achieved. Class II intermaxillary elastics assist in the lingual movement of the maxillary incisors, and finally effect the maxillary working and mandibular stabilizing arch wires to obtain a Class I relationship of the dental arches.

According to Tweed, the advantages of early treatment are as follows:

1. Reduction by at least one-half in total man-hours spent in actual hard work.
2. Less scarring of tissues because the only permanent teeth banded are the first molars and the four incisors.
3. Natural eruption of the canine and second premolar teeth in their normal places, with less danger of relapse.
4. Correction of a Class II condition, requiring less than one-half the time and one-half the amount of intermaxillary pull necessary in the treatment of a similar condition in the permanent dentition.

SUMMARY

1. A review of the history of the evolution of the edgewise arch mechanism has been presented. Starting with the "E" arch, the appliances

developed by Edward H. Angle have been surveyed briefly. These appliances include the "pin and tube," the "ribbon" arch, and finally the edgewise arch mechanism.

2. Angle's treatment plan in his later years embodied the concept of stationary anchorage inherent in the edgewise arch mechanism. Expansion was endorsed with the basic tenet that function and growth would work together for the development of the denture to its full potential.

3. The Tweed philosophy, in placing the mandibular incisors upright over basal bone, soon rejected the practice of lateral expansion and accepted the dental arch form of the patient with malocclusion as the final form after treatment. To align crowded or protrusive dental units properly within the confines of a given amount of bony support, extraction of dental units was recommended.

4. The Bull technique, a modification of Tweed's original procedure, varies in the degree to which the mandibular canines and incisors are retracted and in the manner in which the mandibular posterior segments are treated. The forward movement of the mandibular posterior teeth serves as the resistance unit for the distal movement of the maxillary canines and incisors.

5. The Northwest technique, also a variation of Tweed's philosophy, utilizes a headgear applied directly to the mandibular arch to establish and maintain anchorage. An intercanine coil is used for the distal movement of mandibular canines, while a Hawley appliance initiates distal movement of maxillary canines prior to their complete eruption.

6. Recent advances in the Tweed philosophy place strong emphasis upon the Frankfort-mandibular incisor angle (FMIA) as an exact angular expression of an upright incisor. The Kesling diagnostic setup, correlated to the FMIA, is recommended as a means of determining available or insufficient space in the dental arch.

7. Treatment in the mixed dentition is recommended by Tweed to reduce treatment time, to prevent scarring of tissues, to decrease danger of relapse, and to effect the correction of a Class II condition more rapidly.

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A CEPHALOMETRIC METHOD FOR THE LINEAR ANALYSIS OF THE HUMAN PROFILE

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THE PROBLEM

IN THE past two decades, orthodontists have seen the development of intensive studies in the field of the human profile. Most discussed among these studies are those by Downs,[1] Tweed,[2] Steiner,[3] and Wylie.[4] In Europe, Björk[5] has done outstanding work in the development of cephalometric techniques in the study of the human profile. The work has been concentrated on the profile rather than on the frontal aspect of the face for the reason that cephalometry, at least in its present state of development, lends itself more readily to the techniques used in profile analysis.

All the studies just mentioned have in common the concept of measuring spatial relationships through the agency of angles. In addition to the use of angles, several studies make use of linear measurement to supplement the angular observations. However, with the exception of Wylie's studies in the field of dentofacial dysplasia, linear measurement has been very much neglected. One of my reasons for writing this article is my conviction that linear measurement has been sadly neglected in cephalometric techniques.

Another possible objection to the present profile studies lies in their practical application to orthodontic problems. Both the Downs analysis and the Steiner analysis, through angulation, refer various facial points to sella turcica. This is good procedure in theoretical problems, but when we consider the problem that the orthodontist has in conveying the relationships of the various parts of the face to the parent of the patient, we can see what an abstract point the center of sella turcica is to the average mother. Nasion, however, is something one can point to on the patient's face, and the average mother will have a better understanding of the point which the orthodontist is trying to convey to her.

In addition to the disadvantage of referring facial points to structures in the center of the skull, the foregoing studies by Downs and Steiner lack consistency in the referring of the various facial points to cranial or facial structures. Some structures are related to sella, others are related to each other, and still others are related to nasion. It seems to me that the facial profile can be laid out like a map, and all points upon it, through a coordinate system, can be referred to one central point. In this way, all the points in the face can be located with reference to one point, and hence in reference to each other.

For example, going back to the coordinate map simile, we can relate Cleveland and Chicago to each other by relating them both to New York. This is much less confusing than relating Cleveland to San Francisco and Chicago to New Orleans. In the latter instance, we still would not know where Chicago and Cleveland were in relation to each other.

A still further point in which the orthodontist should be interested is the possibility of achieving an index of malocclusion in order that public health techniques could be used to evaluate the amount of the severity of malocclusion in given communities. Mixing of angular and linear measurement is not readily adaptable to such techniques. Adoption of either all angular measurement or all linear measurement in cephalometric observation is much more desirable and, since some of the observations cannot be expressed by the angular method, but all can be expressed by the linear method, the latter should be the method of choice. This is the reason for a part of the title of this article, namely, "The Linear Analysis of the Human Profile."

THE FIRST EFFORT TOWARD THE SOLUTION

The foregoing statement is based on hindsight rather than foresight, as will be explained in my discussion of the reasons that the present study was started. Several years ago the United States Public Health Service initiated a study which required a quantitative dentofacial evaluation. This evaluation was needed for epidemiologic handling of orthodontic data. Previous to the aforementioned study, a comprehensive epidemiologic analysis of orthodontic problems had not been possible for several reasons, chief among them being the deficiency in the orthodontic literature of a satisfactory method for the quantitative evaluation of malocclusion. Since epidemiology requires quantitative appraisal, it is clearly understandable that, in order to conduct an epidemiologic study, it was necessary to develop a quantitative means of appraising malocclusion.

In deciding on the technique to be used, the first consideration was given to cephalometry, because it was felt that only by means of cephalometry could the measurements which were so vital to the quantitative method required in epidemiology be obtained. The cephalometric analysis first investigated for the problem was the Downs analysis. The effort to include the Downs analysis in the attack of the epidemiologic problems was abandoned when it was discovered that the use of angular measurement was not practical in arriving at the quantitative index required by the problem at hand. Further research revealed, however, that the Downs analysis would have been ruled out at any rate, as cephalometry itself had to be dropped because of the expense involved.

Some measuring instrument, however, was required if an orthodontic epidemiologic index was to be formulated. After several experimental models were built and tested, the Public Health Service completed an instrument which is a nonroentgenologic cephalometer, since it measures cranial and facial points without the use of an intervening roentgenologic technique. The instrument consists of a head holder with two ear rods and a combination vertical and horizontal sliding scale which will measure the distance from any

given vertical plane through nasion, running perpendicular to the Frankfort horizontal plane, to various midline facial profile points. In addition to this, the instrument will measure the distances vertically between midline profile points.

The orthometer was developed before a definite facial pattern analysis was devised to be used in the study. At this point, it became necessary to devise a formula for the epidemiologic analysis of facial pattern.

Following the techniques of former epidemiologic studies, a clinically normal sample was first obtained, and from this sample a standard was set up. From this standard, a measurement of the degree of malocclusion, known as the dentofacial index (DFI), was established. The details of the DFI are published elsewhere[6] and are not of interest here, so their description will not be undertaken. However, the index is mentioned here because I feel that it would have been impossible to develop the method using angular measurement, and it was during the development of the DFI that the possible application of straight-line orthometric techniques was noted as a possibility for roentgenologic cephalometric application.

THE TRANSITION FROM ORTHOMETRY TO CEPHALOMETRY

The foregoing brief description of the DFI is injected here to make clear why the work on this article was started. As implied, the DFI was used only in the epidemiologic studies. While it was useful in that field, it did not have much value in the individual appraisal of cases, since the index is merely a single number which expresses the degree of malocclusion. However, since the DFI was derived from linear profile study, I felt that a similar technique of straight-line measurement could be applied to roentgenologic cephalometry in the study of individual cases.

From what has been written so far, it is apparent that what is coming up is the old bugbear of statistical analysis of a biologic phenomenon, and it is granted that many outstanding workers are very much in opposition to statistical analysis of morphologic biologic problems. A statement of the premise on which such a statistical standard is based is therefore indicated.

Brodie[7] and several other workers are very much opposed to statistical standards against which individual facial patterns are to be appraised. Their reasoning is based on the philosophy that there is no norm or standard which can be used in dealing with human morphology. While it is true that there are such things as normal blood calcium, normal blood cholesterol, and the like, it does not appear to be true that there is a normal anteroposterior relationship between the upper and lower jaws or a normal relationship between tooth size and jaw size.

Apparently a person can live quite comfortably with a king-sized maxilla and a peasant-sized mandible. However, that same person cannot live without medical aid if his blood sugar is above or below a very narrow normal range. Apparently, physiology and morphology are not subject to the same

narrow range of mathematical exactness. It is for these reasons, then, that Brodie is very much opposed to fitting the individual facial pattern into the mold of a standard.

Most of us will have no argument with Brodie's reasoning in this matter in so far as the concept of there being no normal in morphology goes; however, the fact that we grant that there is no normal in morphology should not bar us from comparing an individual patient with an arbitrary normal. This arbitrary normal can be based on a perfectly straight face with all the midline facial points touching a vertical line perpendicular to the Frankfort horizontal plane, or it can be based on the mean measurements of actual incivdual profile points from such a vertical plane as described above.

Whatever the standard, however, we will not be in trouble if we constantly bear in mind that we are merely *comparing* the individual with the standard, and not trying to fit him into the mold of the standard. Looking at this matter in another way, we are using a standard as a means of classifying the malocclusion on a quantitative basis. If this is borne in mind during cephalometric appraisal, the objections of Brodie and others should be met.

Since the Public Health Service study was primarily an epidemiologic study, the quantitative aspects of the classification of malocclusion were an absolute necessity and some sort of standard was essential. The DMF for dental caries epidemiology has a standard of zero against which all children are compared. Every one of us realizes that no dental caries is not the normal situation, yet in our society we are so conditioned to speaking of things on a quantitative basis that we must have a numerical evaluation when we are speaking of many children in their experience with dental caries. If this is true for dental caries, it is also true for malocclusion; the only difference is that the standard for the latter is more difficult to devise because, unlike dental caries, there are many morphologic characteristics to take into account.

The Public Health Service study was completed, and the DFI was used as a quantitative method of appraising malocclusion. I had a part in the study and, having had a long-standing interest in facial profiles, I saw the possibility of applying the orthometric method to the cephalometric analysis of the facial profile.

The transition from the orthometric method to the cephalometric method must have some justification other than its being just another subject on which to write a thesis. It is felt, therefore, that there is more than sufficient reason for the adaptation of the orthometric method to the cephalometric method for the study of the profile.

Present cephalometric methods, granting them all the credit which is due them, are just a little too complex for the rapid evaluation required in the office of the average orthodontist. If, as is done by many orthodontists, the tracing is discussed with the patient, the use of angles is a little subtle for the average person to assimilate in one sitting. When the angular measurement is mixed with linear measurement, the confusion is compounded.

To be absolutely fair in pushing for linear measurement rather than angular measurement, it must be admitted that, under the present tracing methods, linear measurement is no less complicated or difficult to interpret than angular measurement. However, as intimated earlier in this article, if the entire procedure could have a single reference point, and the person evaluating the tracing could have the means to see just where one point might lie in relation to another point and in relation to the starting point, the analysis of the profile would be much easier to interpret. Both of these objectives—the single reference point and the easy location of other points in relation to each other and to the reference point—are possible through the use of regular coordinate paper. In order to keep the procedure as simple as posssible, the coordinate paper should be transparent enough for tracing and it should be laid off in major divisions of centimeters and minor divisions of millimeters.

Once the decision was made to devise an all-linear analysis of facial pattern using a single reference point and coordinate paper, the transition from orthometry to cephalometry was relatively easy. The first problem that needed attention was that of the reference point and the variety of other points to be used in the analysis. In all the former cephalometric analyses, nasion seems to be a focal point and, in the derivation of the DFI, it is also a focal point. In the gross appraisal of a human profile, it seems that one always views the facial points under nasion in their horizontal relationship to nasion. For instance, in a gross Class II malocclusion, we invariably notice that the chin point is extremely distal in its relationship to the forehead. In a Class III malocclusion, we notice the reverse to be true. In the average orthodontic case, there is growth forward of nasion during the interim of treatment and, although the amount of such growth cannot be determined by the linear analysis of the profile, the change in horizontal relationship to the remaining facial profile points can be readily seen. After all, clinically we are not interested in quantity of growth nearly so much as we are in the change of relationship of the parts of the face during orthodontic treatment and, of all these changes, a change in the relationship of position to nasion is most noticeable. For the foregoing reasons, it was decided that nasion would be the point of reference in this study of the human profile.

In order to keep the procedure interchangeable with existing cephalometric analyses, the following points in a vertical direction from nasion were included in the study:

1. Point A.
2. The point of intersection in a vertical direction in the distance between the tips of upper and lower incisors.
3. The tip of the upper incisor.
4. The tip of the lower incisor.
5. Point B.
6. Pogonion.

7. The lowest point on the chin, that is, that point at which the labial plate and the lingual plate of the mandible come together at the midline.

In addition to recording the points above in the tracing, there are five planes recorded in the study as follows:

1. The Frankfort horizontal plane.
2. A vertical plane perpendicular to Frankfort, and running in a vertical direction from a point 20 mm. anterior to nasion. Twenty millimeters was selected in order to be far enough away from the profile that even the most severe protrusions would be inside the plane.

Fig. 1.

3. The plane of the long axis of the upper incisor.
4. The plane of the long axis of the lower incisor.
5. The plane of the lower border of the mandible.

In using transparent coordinate paper, there must be excellent visibility through the paper to the illuminated headplate for the reason that the facial points must be oriented to the graph paper in the following manner: Nasion is placed on one of the vertical major coordinates of the graph paper. With nasion held on this coordinate, the graph paper is rotated until the Frankfort horizontal plane is parallel to one of the horizontal major coordinates. The

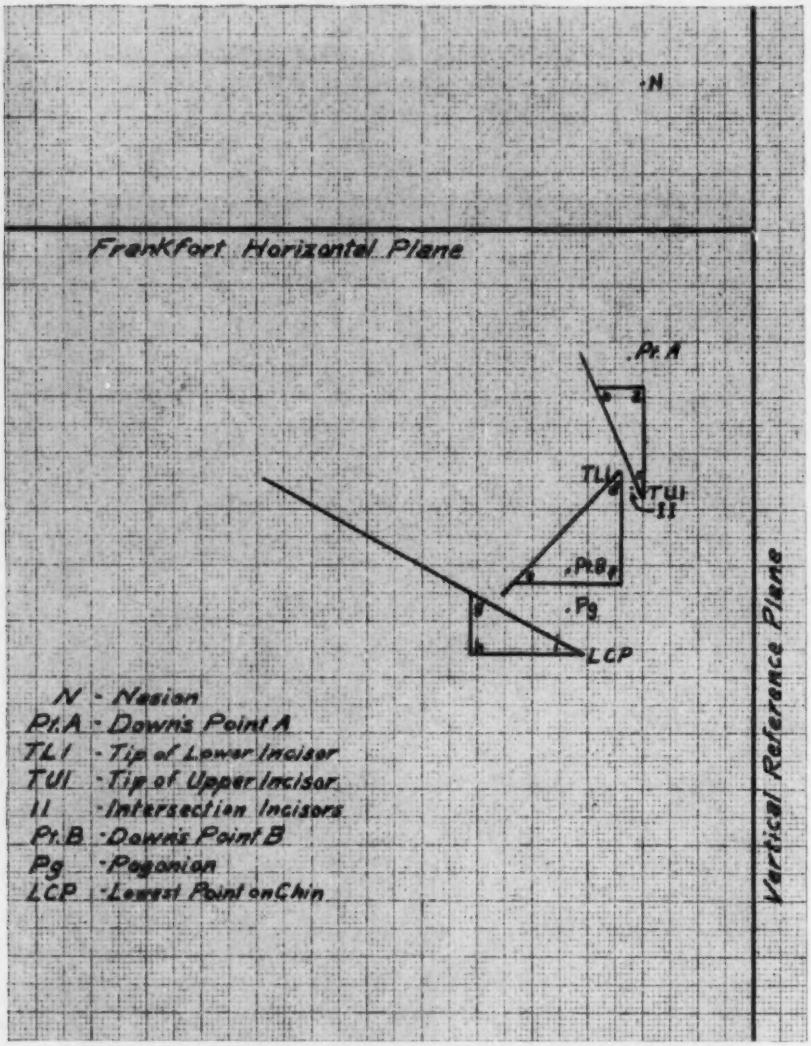

Fig. 2.

remainder of the facial points and the planes are then placed on the coordinate paper. As stated previously, the facial points, especially nasion and the two ends of the Frankfort horizontal plane, must be seen very clearly through the graph paper and, therefore, before the tracing is made holes are punched directly through the film at each landmark so that a pinpoint of light shines through each one while the tracing is being made. This is illustrated in Fig. 1.

After several of the tracings described above were made, it was decided that a full tracing was not necessary, since the points concerned were all that were needed. Therefore, the policy of placing only pertinent material on the graph paper was adopted. Fig. 2 shows a typical tracing.

A study of Fig. 2 will make it apparent that the tracing now has become but a shorthand version of the original tracing. However, everything needed to make a full and clear analysis of the profile is present on it. As intimated in the introduction to this article, by means of this type of tracing, the face in profile can be treated as a map, and various facial points can be located with reference to each other and with reference to a central focal point, nasion.

After the mechanics of making the tracing were decided upon, a standard had to be adopted for the appraisal of individual cases. The justification for the use of a standard has been briefly discussed and, since this article is concerned with a concept which uses a standard, further philosophizing for the purpose of justifying the use of a standard would only put me in the position of going on the defensive for such a concept. I believe that no one method of doing anything is the ideal method, and if one wishes to use a standard, so long as the use of it is not abused, no harm will result in his findings.

MECHANICS OF LINEAR PROFILE TRACINGS

For some time, Dr. Charles Tweed's work concerning his concept of what the human profile should be has kept most of us in orthodontics in a state of indecision. Tweed has favored the straight and flat profile, while others have been in favor of a more full or petulant profile and still others have insisted that the ideal facial profile is somewhere between the full pout and the strong flat face favored by Tweed. I am of the opinion that there is no normal face, and that there is no point in trying to find one. However, Tweed has taken the trouble to go after persons whom he considered to have normal faces, and to make headplates of them. Consequently, he has accumulated what amounts to a fairly good-sized sample of untreated normal (according to Tweed) faces.

Since a standard is based on a sample, the constituents of which have something in common, application was made to Dr. Tweed for permission to use his sample, and I am greatly indebted to Dr. Tweed for granting permission to use the sample to establish a standard.

Accordingly, tracings of the type shown in Fig. 2 were made for each of the persons in Tweed's sample. The tracings were analyzed as follows:

The rationale of this study is that everything can be measured with reference to the focal point, nasion. In referring to nasion, however, it is necessary to make use of the oriented planes, namely, Frankfort horizontal and the vertical reference plane. If the distance of some point on the midline of the profile is measured from the vertical plane of reference, since the latter is oriented to nasion on a coordinate basis, we are at the same time relating

whatever point we are measuring to nasion. Therefore, on all the tracings of the sample, the following distances from the vertical reference plane were recorded:

1. Point A to the vertical plane of reference.
2. Tip of the upper incisor to the vertical plane of reference.
3. Tip of the lower incisor to the vertical plane of reference.
4. Point B to the vertical plane of reference.
5. Pogonion to the vertical plane of reference.

The above dimensions give the horizontal relationships of the various points to nasion. In addition to this, however, some interest in vertical relationships is indicated. Pursuing this idea, the distance along the vertical plane of reference from the level of nasion to the level of a point halfway between the tips of the upper and lower incisors (II) was measured. In addition to this, the distance along the vertical reference plane from the level of nasion to the level of the lowest point on the chin (LCP) was measured. Since we know that these vertical dimensions mean nothing in absolute value, but that they are important in the proportion of one to the other, both before and after treatment, the proportion II–LCP/N–LCP was calculated and recorded for each person in the Tweed sample.

Another horizontal measurement recorded was the difference between the distances from (1) vertical reference plane to point B and (2) vertical reference plane to point A.

Referring back to Fig. 2, it will be noted that three triangles are outlined on the tracing. The construction and the rationale of these triangles are as follows: Taking triangle *abc* as an example, the line *bc* represents the long axis of the upper incisor. The line *ac* is a 20 mm. line originating at the tip of the upper incisor and running toward pogonion parallel to one of the vertical coordinates on the graph paper. This line is therefore perpendicular to the Frankfort horizontal plane. In all instances, the line *ac* is a constant 20 mm. in length. The line *ab* connects the end of the line *ac* and the long axis of the upper incisor, *bc*. It (*ab*) is parallel, of course, to the Frankfort horizontal plane. The length of the line *ab* is referred to as the inclination of the upper incisor. Table I indicates the conversion to angular measurement of the various lengths of the inclination of upper incisor lines for those who wish to have this information.

The triangle *def* is constructed in the same way that triangle *abc* was; *de* is the long axis of the lower incisor, *df* is the 20 mm. line running from the tip of the lower incisor, and the line *ef* is the inclination of the lower incisor line. The angular values which correspond to the various lengths of the line *ef* may be found in Table I. In this particular instance, the angle corresponding to the length of the line *ef* is the IFMA.

It should now be apparent that the two triangles just mentioned express the angle made by the long axis of the upper and lower incisors and the Frankfort horizontal plane. The third triangle, *ghi*, expresses the linear value of

the Frankfort-mandibular plane angle. The line *gi* represents the mandibular plane. The line *ih* is a line originating at point *LCP*, the anterior end of the mandibular plane, and running parallel to the Frankfort horizontal plane in a distal direction for 20 mm. The line *gh* connects the 20 mm. line and the

TABLE I

UPPER AND LOWER INCISORS		MANDIBULAR PLANE	
INCLINATION (MM.)	ANGLE (DEGREES)	INCLINATION (MM.)	ANGLE (DEGREES)
20.0	45	0.3	1
19.5	46	0.7	2
18.5	47	1.0	3
18.0	48	1.4	4
17.5	49	1.8	5
17.0	50	2.1	6
16.0	51	2.5	7
15.5	52	2.8	8
15.0	53	3.2	9
14.5	54	3.6	10
14.0	55	3.9	11
13.5	56	4.2	12
13.0	57	4.6	13
12.5	58	5.0	14
12.0	59	5.4	15
11.5	60	5.7	16
11.0	61	6.1	17
10.5	62	6.6	18
10.0	63	6.9	19
9.5	64	7.3	20
9.3	65	7.7	21
9.0	66	8.0	22
8.5	67	8.5	23
8.0	68	9.0	24
7.7	69	9.3	25
7.3	70	9.5	26
6.9	71	10.0	27
6.6	72	10.5	28
6.1	73	11.0	29
5.7	74	11.5	30
5.4	75	12.0	31
5.0	76	12.5	32
4.6	77	13.0	33
4.2	78	13.5	34
3.9	79	14.0	35
3.6	80	14.5	36
3.2	81	15.0	37
2.8	82	15.5	38
2.5	83	16.0	39
2.1	84	17.0	40
1.8	85	17.5	41
1.4	86	18.0	42
1.0	87	18.5	43
0.7	88	19.5	44
0.3	89	20.0	45
00.0	90		

mandibular plane. It is parallel to the vertical plane of reference, and it expresses the inclination of the mandibular plane with reference to the Frankfort horizontal plane. Reference to Table I will indicate the Frankfort-mandibular angles which correspond to the various linear dimensions of the line *gh*.

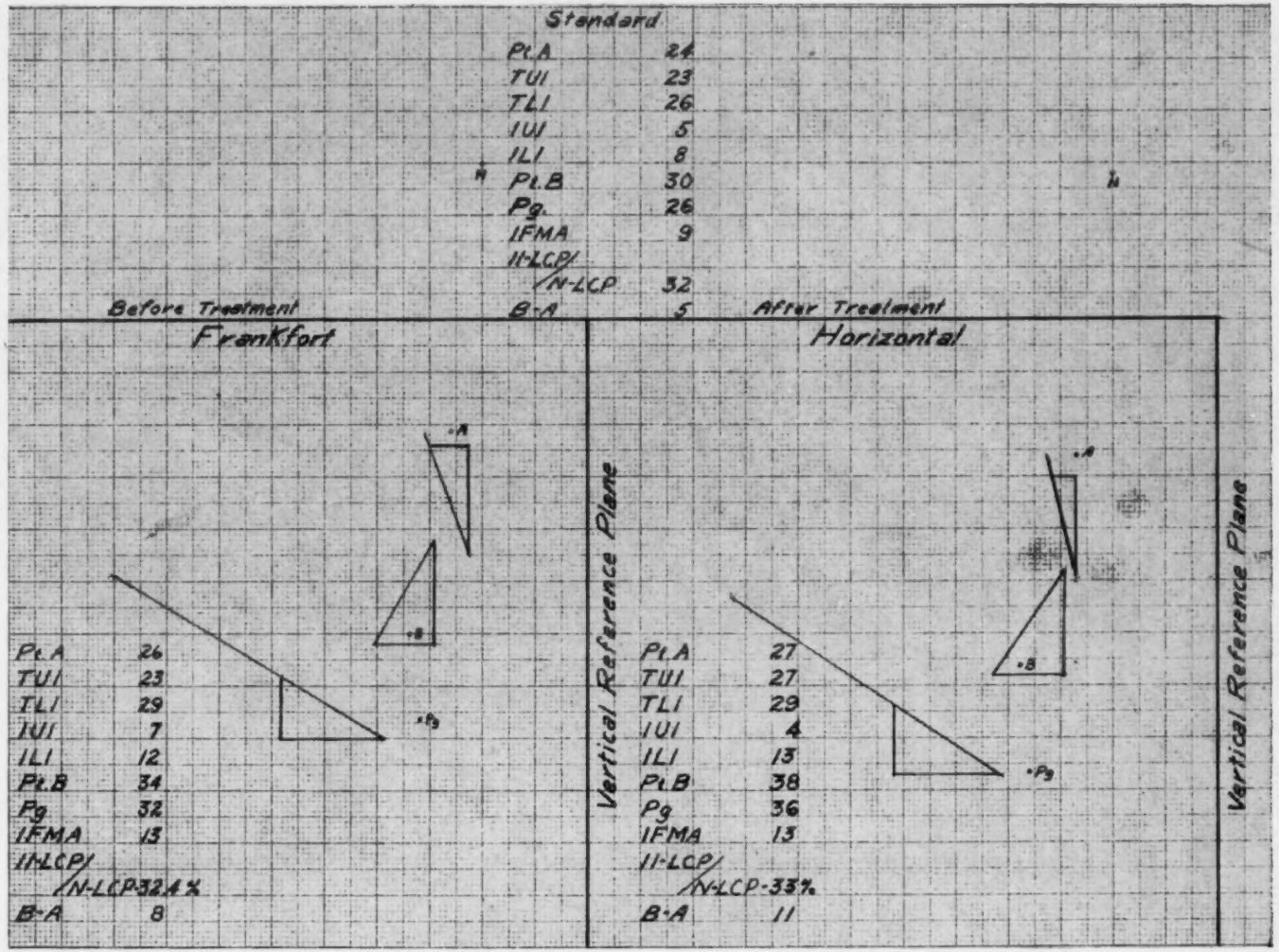
Standard
Pt.A 24
TUI 23
TLI 26
IUI 5
ILI 8
Pt.B 30
Pg. 26
IFMA 9
II-LCP/N-LCP 32
B-A 5
Before Treatment
Frankfort
Pt.A 26
TUI 23
TLI 29
IUI 7
ILI 12
Pt.B 34
Pg 32
IFMA 13
II-LCP/N-LCP 32.4%
B-A 8
Vertical Reference Plane
After Treatment
Horizontal
Pt.A 27
TUI 27
TLI 29
IUI 4
ILI 13
Pt.B 38
Pg 36
IFMA 13
II-LCP/N-LCP 33%
B-A 11
Vertical Reference Plane

Fig. 3.

All the observations made on the tracings for all the subjects in the Tweed sample were recorded in statistical tables. A mean and a standard deviation were caculated for all the single observations. The results of these calculations can be seen in Table II. The column headed "Range" is composed of the values of two standard deviations on either side of the mean. Table II, then, represents the standard from the Tweed sample for the profile analysis. It must be reiterated that this does not mean that every individual case is to be squeezed into the mold of the normal ranges of the components of the analysis. However, this analysis and its standard can be used to classify our individual cases with respect to Tweed's sample.

To indicate the use of the standard, an example should help materially. Fig. 3 represents the actual tracings of a case before and after treatment. As is apparent in the figure, the "before and after" readings are placed on either side of the standard column in order to show how the individual case before and after treatment compares with the typical case in the Tweed sample. By reading from left to right, we can see the readings on our individual case before treatment, the standard values, and finally the readings after treatment was completed.

TABLE II. THE STANDARD FOR THE FACIAL PROFILE

OBSERVATION	MEAN (mm.)	STANDARD DEVIATION (mm.)	RANGE (mm.)
Ref. Plane—Pt. A	24.21	±3.3	17.5-30.7
Ref. Plane—Tip of U.I.	22.52	±4.4	16.7-34.3
Inc. of U.I.	5.45	±2.28	1.4-10.5
Ref. Plane—Tip of L.I.	26.3	±4.5	17.3-35.3
Inc. of L.I.	7.6	±2.1	3.4-11.8
Ref. Plane—Pt. B	28.9	±5.14	18.6-39.2
Ref. Plane—Pg.	26.4	±5.5	15.4-37.4
Inc. of Frankfort Mand. Plane Angle	9.2	±1.9	5.4-13.0
II-LCP/N-LCP	32.2	±2.88	26.4-37.9
B minus A	4.9	±2.6	-0.3-10.1

Taking each component of the analysis and interpreting it, we find that at the beginning of treatment, point A was located 26 mm. from the vertical plane of reference. The range of the standard is 17.5 mm. to 30.7 mm., so this particular case is well within the range of normality in so far as the Tweed sample is concerned. After treatment was completed, point A was found to be 27 mm. from the plane of reference, so the treatment apparently has not affected this relationship except that we must remember that nasion undoubtedly was being carried forward by growth during this time, and so point A remained stationary due to distally directed orthodontic force.

The tip of the upper incisor was 23 mm. from the plane of reference at the beginning of treatment. The normal range of the standard is 16.7 mm. to 34.3 mm., so this distance is within the normal range. At the end of the treatment, the tip of the upper incisor was 27 mm. from the plane of reference; thus, the interpretation here, since point A has not changed materially in relationship to the plane of reference and hence in relationship horizontally

to nasion, is that the apex of the upper incisor has been torqued mesially with reference to nasion, while the tip of the upper incisor has moved lingually, indicating a point of rotation between the crown and the apex.

Initially, in this case, the inclination of the upper incisor was 7 mm., while the standard has a range of 1.4 mm. to 10.5 mm. During treatment, the inclination of the upper incisor was reduced to 4 mm., which is consistent with the observation that the upper incisor was torqued to labially with the tip moving lingually.

The distance from the reference plane to the tip of the lower incisor started at 29 mm., the standard range being from 17.3 mm. to 35.3 mm. At the end of treatment, the distance from the reference plane to the tip of the lower incisor was still 29 mm., indicating a relatively stationary point here with reference to nasion.

On the other hand, the inclination of the lower incisor changed from 12 mm. at the beginning of treatment to 13 mm. at the end of treatment, the standard range being 3.4 mm. to 11.8 mm. This also indicates very little change in relative inclination with relation to the Frankfort horizontal plane. However, both the before treatment and after treatment values here are beyond the degree of inclination which Tweed likes to see in his cases. This, however, does not indicate failure in the case; rather, it merely indicates that this particular patient was not jammed into the mold of the Tweed sample.

During the course of treatment, pogonion moved away from the plane of reference (posteriorly) 4 mm. This is still within the limits of the standard. However, the interpretation here is that nasion moved forward through growth, in relation to all the points below it in the face.

The inclination of the Frankfort-mandibular plane did not change from 13 mm. from before treatment to after treatment. This indicates no change in the angular relationship between the lower border of the mandible and the Frankfort horizontal plane.

Opening of the bite accounts for the increase in the proportion II–LCP/N–LCP.

So much for the interpretation of the individual case. It will be noted here that little use was made of the standard for the reason that this case was well within the range of the standard. However, if some of the components of this analysis had varied widely from the range of the standard at either end, some consideration would have been given to this at the beginning of treatment.

DISCUSSION

A method which enables us to analyze orthodontic cases by the graphic method has been presented. No angular measurements are used; this makes it possible to group the data for statistical analysis without the disadvantage of having to reduce all values, angular and linear, to a common denominator.

The use of angles introduces dimensional inaccuracies into any cephalometric study, but it is granted that angles must be considered in making a case

analysis. However, when the functions of the angles are expressed in millimeters, as has been done in this article, it is believed that one of the big disadvantages of angular measurement has been overcome. Let us take Tweed's FMIA[2] as an example. Tweed is forced to express his normal values of the IFMA in terms of a certain range of values of the Frankfort-mandibular angle. To quote Tweed, "There are those of us who use the phrase 'compensating the inclination of the mandibular incisors for varying FM Angles.' The meaning of the phrase is that for each degree the patient's FMA exceeds the norm of 25° the mandibular incisor must be positioned a corresponding number of degrees posterior to their accepted 90° norm." This means that the angular values must be mentally juggled around until the desired combination is obtained. Imagine how much easier it would be to add the linear inclination of the lower incisor angle, *ab* in Fig. 4, and the linear inclination of the Frankfort-mandibular angle. If one subscribed to Tweed's scrupulous adherence to the values of the angles for making decisions, this linear method would be of much greater value to him than going to all the trouble of making a full tracing and placing the desired angle upon it.

In Fig. 4, if the Frankfort-mandibular angle is 30 degrees, then the FMIA (Tweed) must be 65 degrees. If the Frankfort-mandibular angle is 25 degrees, the FMIA (Tweed) must still be 65 degrees to be consistent with Tweed's concept of the proper magnitude of the IFMA for stability of finished results. If, on the other hand, the Frankfort-mandibular angle is 40 degrees, 65 degrees could still be insisted upon as the proper FMIA (Tweed). It is not the purpose of this article to decide whether this is right or wrong. The above angular combinations are used only as an example of a hypothetic case to indicate how the angles can be much more simply expressed in terms of their linear inclinations as outlined in this article.

Going back to the three combinations mentioned previously, if we take them in turn and refer to Table I, we will see that the sums of *ab* and *cd* are 20.8 mm., 18.6 mm., and 26.3 mm., respectively, for the angular combinations. If these three sums are now put in the order of ascending magnitude—18.6, 20.8, and 26.3—it will be noticed that as the sums increase in magnitude, the case becomes less favorable from the standpoint of the Frankfort-mandibular plane angle in so far as Tweed is concerned. What is being attempted here, then, is to point out that for those who wish to use Tweed's ideas, the linear method should save much in the way of mental gymnastics by reducing the observation to one variable rather than three variables.

The above gives only one example of how the various angles can be stated in terms of linear measurement, but the analysis outlined in this article makes use of only three angles. However, there is no reason that the linear method could not be applied to great advantage to any of the angles used in other facial analyses, since the relationship of one angle to one or more other angles can be expressed in one number as a sum or difference of their linear inclinations.

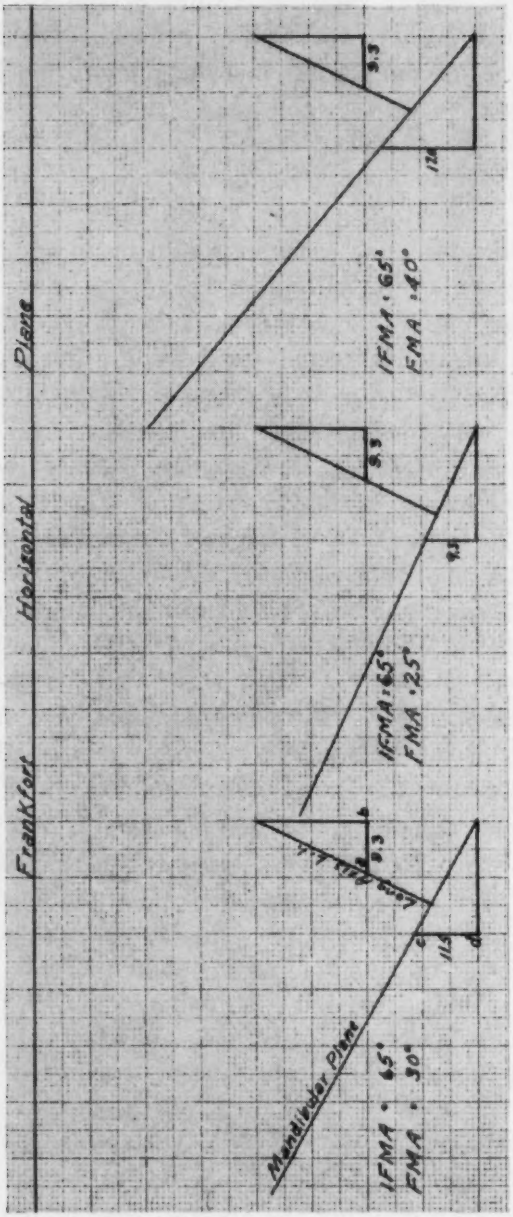
Frankfort Horizontal Plane
Mandibular Plane
IFMA : 65°
FMA : 40°
IFMA : 65°
FMA : 25°
IFMA : 65°
FMA : 30°

Fig. 4.

Another example of what I consider to be a simplification over other analyses is in the expression of the relationship of points A, B, and Pg. With the angular method, the horizontal relationship of A and B is expressed in terms of the angle ANB, and the relationship of A and Pg is expressed as ANPg. It seems much simpler to express these relationships as simple differences of the distances of the concerned points from the vertical plane of reference.

In a recent course given by Dr. Ricketts, the statement was made that Dr. Downs had been in the habit of giving his students sets of figures from hypothetic tracings, and the students were able to reconstruct the cases from these figures. In fact, and this was presented for its amazing effect, in one case the students were even able to reconstruct an anterior cross-bite. Admittedly, it is amazing that students were able to reconstruct an anterior cross-bite from Downs's analysis figures. However, the fact is that, once one became familiar with the linear analysis technique, the reconstruction of an anterior cross-bite, given a set of figures, would be strictly routine.

The idea of the use of an average or standard in appraising orthodontic cases is not new. The pros and cons have been kicked around for a number of years now. However, work on this project has convinced me that even in selected samples the range of the standard deviations from the means is too great to warrant use of the means as norms. In Tweed's own sample, which was carefully analyzed by the profile analysis, the range of two standard deviations around the means of the components would accommodate some of the worst cases of clinically observed malocclusions. Even the use of only one standard deviation from the mean for a norm would accommodate many moderately severe clinically observed malocclusions.

In view of these facts, I was forced to conclude, as stated earlier in this article, that a standard could be used only in the individual classification of malocclusion. This means that the individual case can be described in terms of the standard, but we cannot hope to treat a case to the rigid dictation of the standard.

This, however, brings up one point concerning Tweed's observations which bears mention. Tweed has stated that the FMIA should be 65 degrees or thereabouts. He then went out and picked, at random, the cases used as the standard in this article. The statistical analysis of the sample revealed that the range of two standard deviations for the inclinations of the lower incisors (IFMA) was 3.4 mm. to 11.8 mm. (80 to 59 degrees). The range of the inclination of the mandibular plane, also two standard deviations, was found to be 5.4 mm. to 13 mm. (15 to 33 degrees FMA). The interesting thing here is that Tweed is able to demonstrate that he can pick untreated cases which fit his requirements, and for this he must be given credit. In spite of the great range, the mean is right on 65 degrees, and the range is not excessive when the law of the compensation of the lower incisor is considered.

On the other hand, all Tweed has proved is that he can pick individual persons who fulfill his requirements. To insist that every person fit these requirements is not scientific. Because a few men interpret statistical observation to their preconceived ideas, however, neither is Brodie justified in his complete refutation of statistical procedure.

Wylie[8] has accused the extremists in cephalometry of engaging in the numbers racket and, with modifications, I am inclined to agree with him. However, the fact that the numbers racket is a racket is no reason to abandon numbers as a medium of exchange of ideas. By the same token, because the use of measurements has been abused in cephalometry and in orthodontic diagnosis, we should not abandon the quantitative method; rather, we should change our interpretation of the numbers. One way to do this is to *classify* quantitatively rather than to *diagnose* quantitatively. Orthodontics is still an empirical subject and, as such, it can benefit from the quantitative description of a case, such description being based on a standard. It does not matter much what that standard is, so long as it is used consistently. Once experience has given the orthodontist the information concerning what can be done with cases of given quantitative evaluations, empiricism will aid him in treating future cases.

To classify in this way, more is needed than the Angle classification and similar subjective methods of classification. In my opinion, cephalometry is one of the greatest aids which the orthodontist has at his disposal for the quantitative classification of orthodontic cases. On the other hand, unless the cephalometric classification is systematized and the method is reduced to one unit, we will still have chaos. The method outlined here admittedly presents much room for improvement, but I feel that it is at least a step in the right direction.

Wylie[8] has further stated that cephalometry tells us where we have been and not where we are going, and there is much truth in this statement. Here again the linear analysis of facial profile fits into the picture, since the streamlined "before and after" tracings emphasize only what we are interested in and, in a side-by-side position, using a common Frankfort line for the "before and after," we are in an excellent position to see where we have been.

SUMMARY AND CONCLUSIONS

1. The objections to the use of mixed angular and linear mensuration in cephalometry have been presented. The main objection is the confusion resulting in handling of the data.

2. The need for some more definite method of locating the various facial points in space has been cited.

3. A method of tracing, based on the use of a coordinate system, has been presented.

4. The advantages and the adaptability of the coordinate linear method have been discussed.

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Orthodontic Profiles

CALVIN SUVERIL CASE

CALVIN S. CASE was born in Jackson, Michigan, on April 24, 1847. His early life was spent in Michigan, and he was graduated from Fayette High School in Jonesville in 1864. On April 24 of the same year (his 17th birthday) he entered United States military service in the Civil War.

At the end of the war, in 1865, he commenced the study of dentistry in the office of Dr. Stone in Jonesville, Michigan. Later he became associated with Dr. J. A. Robinson in Jackson, Michigan, and in January, 1867, became his partner in dental practice.

Dr. Case was married to Miss Florence Baxter, of Jonesville, on July 8, 1868.

He was graduated from the Ohio Dental College in 1871, and was one of the first men from the State of Michigan to graduate in dentistry.

Soon thereafter he began dental practice in Jackson, Michigan. In 1881 he accepted a position as demonstrator of prosthetic dentistry in the Dental Department of the University of Michigan. During this time he studied at the Medical School of the University of Michigan and was graduated from that institution in 1884.

Dr. Case served as president of the Michigan State Dental Association in 1889, and was re-elected to that office for 1890. In 1890 he accepted the position of professor of prosthetic dentistry and orthodontics at the Chicago College of Dental Surgery, and delivered the doctorate address to the graduating class of this institution in 1891. In 1895 he was president of the Chicago Odontological Society.

He resigned as professor of prosthetic dentistry at the Chicago College of Dental Surgery in 1896, but remained as professor of orthodontics in the same school and continued teaching throughout the rest of his life. Records indicate that during 1897 Dr. Case also served as professor of orthodontics at the Western Reserve University Dental Department, in Cleveland, Ohio.

The *Index of Periodical Dental Literature* lists 123 published articles from the pen of Dr. Case during the years from 1881 to 1923. It is interesting to note that his first paper was entitled "Dental Education and Mechanics"; this was published in the *Ohio State Journal of Dental Science* in 1881.

He was author of a chapter on "The Development of Facial Contours" in the *American Textbook of Operative Dentistry* published in 1897. Also, he wrote and published the following books:

> *A Practical Treatise on the Technics and Principles of Dental Orthopedia.* (Including drawings and working details of appliances and apparatus for all forms of irregularities of the teeth.) 1908.

A Practical Treatise on the Technics and Principles of Dental Orthopedia and Prosthetic Correction of Cleft Palate. Second edition. 1922.

Dr. B. W. Weinberger has stated: "The writings of many men who attained national and international prominence have been recorded in this résumé, but few in the pursuit of their professional activities have written more on the subject of orthodontia than Case."

CALVIN SUVERIL CASE.

Dr. Martin Dewey, editor of the INTERNATIONAL JOURNAL OF ORTHODONTIA, ORAL SURGERY, AND RADIOGRAPHY, wrote: "It has never been our privilege to examine articles that have been prepared with more careful detail or which presented the subject better than those prepared by Dr. Case. His writings have been many and he was always very convincing in his statements. Many times I did not agree with Dr. Case, but his wonderful nature was revealed by the fact that even though you disagreed with him on a scientific question, he always remained your friend and believed that you had the same right to your opinion that he wished you to allow him to have of his. . . . He realized that certain questions were not yet solved and could be solved only by men frankly stating their differences and then trying to arrive at the truth."

In view of these facts, it is difficult to understand the attitudes and apparent misinterpretations of some of his colleagues when they gave formal

discussion of some of his papers. On occasion, when time was limited at meetings, Dr. Case would furnish written replies to those persons, which were published.

Dr. Case told me that one of his greatest regrets was that he could not have the opportunity of sitting at a conference table with Dr. E. H. Angle, for he felt that such a discussion would show that their ideas on most orthodontic topics and problems were very much alike.

Dr. Weinberger also wrote: "Before the Columbia Dental Congress in 1893, Case presented one of his first papers on 'The Esthetic Correction of Facial Contour.' . . . This paper was practically forgotten until Angle in 1911 re-introduced the subject of 'Root Movement.' Eighteen years elapsed before men in the practice of orthodontia began to pay a great deal of attention to this important phase of their work.

"In this paper Case not only showed the possibility and advisability of changing the position of malposed teeth in regulating but also of applying force in such manner, when necessary, as to produce anatomic changes in the bony tissue adjoining the teeth, thus bringing the parts into harmonious and esthetic relations with the other features.

"To do this he said, 'It would be necessary to move the roots of the teeth as well as the crowns so that any overfullness or deficiency in the root region would be changed to a condition of normality and harmony.' "

The following excerpts from Dr. Case's writings should be of genuine interest to present-day orthodontists:

"I have never advocated extraction as an aid to correction of malocclusions, except in pronounced protrusive positions of entire dentures—the upper or the lower, or both dentures—in relation to the esthetic standard of dento-facial harmony *for the individual.*"

Regarding the classification of malocclusion, Dr. Case wrote: "When we name a class to which a certain malocclusion belongs, we convey a mental picture of *only* the disto-mesial occlusal relations of its buccal teeth, and nothing more, except the fancied conception of its real character and dento-facial relations. And when we go further and name the division of its class, we still have placed it only as one of a family of malocclusions whose individual members may differ quite decidedly from each other when dento-facially considered, though all are alike in one distinguishing characteristic of buccal occlusion. Neither can we place in the mind's eye the individually completed characters of the case in hand until we have named its type, its division and its class."

"To those who believe that teeth should never be extracted for dento-facial correction of the decided unimaxillary and bimaxillary protrusions, Dr. Angle's classification will be found quite consistent with that system of practice.

"It was the marked differences in the character, facial outlines and required treatment of malocclusion in Class II—in which the upper denture is about the width of a cusp in front of a normal occlusion—that led the author to divide this class, as he believed this would more strongly emphasize the importance of

a differential diagnosis of dento-facial characters having the same occlusion of the teeth, certain types of which demand the extraction of teeth in their proper correction, while in others such a procedure would be decided malpractice.

"In other words, it was his desire to free it from the mechanical and mathematical trend toward which the science seemed to be drifting, and to induce a deeper consideration and study of facial art and beauty as important factors of diagnosis and treatment. With the present advancement in the practical principles of orthodontia, it is hoped that a systematized arrangement of all the distinctive types of malocclusion under three heads, upon the basis of their occlusal peculiarity, will enable a full appreciation of the wide differences in dento-facial outlines with patients having, practically, the same occlusal relations of the teeth."

"One of the most dangerous features of the Angle classification, as formerly set forth, and one which, strange to say, has tended to popularize it in the minds of orthodontists, is the universally applied teaching that when dentures are placed in normal occlusion, the facial outlines will take care of themselves; and, therefore, the highest possible orthodontic attainment for that individual is accomplished. If this were as true as is believed by many, it would simplify the whole practice of orthodontia, because in theory it eradicates the necessity of a deep comprehension of dento-facial art, and many other important principles which are so difficult for orthodontists to understand.

"A careful study of the great question of extraction which is so largely dependent upon causes, and which lies at the very foundation of advanced dento-facial orthopedia, must convince every receptive truth-seeking mind of the delusiveness of a teaching which asserts the *universal applicability* of the 'normal occlusion theory,'—which is: 'every tooth or its artificial substitute is necessary for the perfect correction of dental or dento-facial malocclusions.'" (Dr. Case's complete Classified Table of Dento-Facial Malocclusions appears on page 19 of his textbook, second edition.)

Regarding the time required for orthodontic treatment, he states: "I wish to say right here that time is a matter of little importance to me compared to the possibility of accomplishing the desired result without harm to the teeth or special local or systemic disturbance."

In 1895, Dr. Case said: "The extending of rubber bands from the extreme buccal endings of an appliance attached to all the upper or all the lower teeth to points upon the occluding set opposite the first bicuspids has become a common one in my practice in nearly all cases where there is an abnormal antero-posterior relation of the upper and lower anterior teeth." Records seem to indicate that Dr. Case and Dr. H. A. Baker began to use intermaxillary elastics at about the same time, probably about 1893.

The following is taken from a paper published in 1892 on "The Application and Influence of Force in Orthodontia."

"Know well the possibilities presented by Nature; the principle of force and its proper application and management; then if you will adopt some

system in the main whereby the appliances may be constructed under your immediate supervision—permitting a freedom of ingenuity not possible in an attempt to use some particular set already in the market—a far more perfect treatment of malposed teeth will be given, suited to the needs of particular cases in hand."

"In correcting the positions of malposed teeth, it should never be forgotten that the important and indispensable part of the operation is to so regulate the force that the normal functions and healthful conditions of the teeth and surrounding tissues are preserved, and that Nature will permit their movement, physiologically, only so rapid as she is able to take care of the broken down tissue of retrogressive metamorphosis, caused by pressure of the tooth upon the walls of the alveolar socket. The rapidity of the movement will be influenced largely by the age of the patient, and differ as other things differ with people.

"The point which interests us under the caption of this paper relative to the application of force may be stated as follows: as soon as the applied force overreaches the possibilities of natural (and I may say physiologic) change—the surplus is liable to spend itself in producing some undesired and unlooked for condition. In other words, Nature can only work so rapidly, and any attempt to force her beyond her natural powers will result—if not in disaster—certainly in a misdirection, and transferal of the force to other parts which should not, and would not, otherwise be disturbed."

Dr. Case was, without doubt, the outstanding dentist of his time as an exponent of prosthetic correction of cleft palate. A paper entitled "A Method For Producing the Kingsley Cleft Palate Velum" was published in the *British Journal of Dental Science* in 1885, and he continued his study and operations in this field throughout his many years in practice.

In a recent discussion, Dr. Joseph D. Eby stated: "Dr. Case's prosthesis was named the 'Velum-Obturator' and was held in position largely without attachments to teeth and consisted of a veil or hood made of black vulcanite which approximated the posterior wall of the pharynx, also the vicinity of the spine of the Atlas bone, and would be movable upward and downward in the modulations of sounds. Dr. Case was a stickler for 'intelligent instruction' in the 'art' of speaking correctly. He dwelt largely upon 'practical teaching performed persistently.' He stated that success in speech training would depend, 'first upon the character and effectiveness of the surgical operation,' second upon the 'obturator' or speech aid, and third upon the 'ability and persevering determination of the pupil.' Truly the pioneer skills of these men [Kingsley and Case] were forerunners of the modern concepts in the mechanisms of efficient speech production today."

Dr. Case wrote fourteen papers on the subject of cleft palate, and some feel that his greatest work for afflicted humanity and his greatest achievements were in the direction of the prosthetic correction of the cleft palate. He made a study of phonetics, and was able to convey his scientific attainments in this direction to those whose unfortunate affliction made articulate speech impossible.

He made an obturator which was self-sustaining and which restored the function of the soft palate scientifically; then he taught the wearer to speak, and he never ceased until the patient spoke correctly.

Dr. Case gave many interesting clinics, and I was proud when he asked me to assist him in one of them, which was listed as follows in the program of The Golden Anniversary Meeting of the Illinois State Dental Society at the Hotel LaSalle in Chicago in 1914.

> Method of Taking Impressions of Cleft Palate Mouths and the Construction of the Velum Obturator.
>
> Note: An opportunity will be given to examine several patients using obturators, which require no supporting plate to sustain them at all hours of day or night and with which patients speak with perfect enunciation.

The impression was taken in two parts. First, plaster was applied through the cleft in the palate and allowed to harden. After separating medium was applied to the exposed plaster, a plaster impression of the palate was made, with or without a special tray. After the second application of plaster set, both portions were removed from the mouth and fitted together properly, producing an accurate impression of the entire abnormal area. The velum was vulcanized in a special flask designed by Dr. Case.

To get a clear picture and better understanding of the great work done in this field by Calvin Case, the last few chapters in the second edition of his textbook are recommended for study.

Among the writings of Dr. Case were three papers on oral surgery, twenty papers on prosthetics, five papers on operative dentistry, nine papers on facial development, and many others (including the subjects of "Instruments and How to Make Them," "Plaster Impressions of the Face," "Impacted Teeth"), and, as you might expect from such a fine character, there was an article on "Professional Ethics."

As early as 1917 Dr. Case used small-gauge resilient arch wires, fitted into open-tube attachment bands in the alignment of extreme malocclusions and open-bite cases.

In discussing retainers, he wrote that he had "used black rubber plates with nicely fitted interproximate extensions, and often with German silver spurs and labial bows vulcanized into the plates to exert special retaining forces." He used these retainers during his early practice and for a few years after 1890.

Dr. Case was well informed in the field of biology and gave a course of lectures on the subject.

Dr. Case received an honorary membership in the First District Dental Society of the State of New York in 1908.

He was made an honorary member of Alpha Chapter of Delta Sigma Delta Fraternity, at Ann Arbor, Michigan, in 1883. He assisted in establishing the Chicago Alumni Chapter of the fraternity on May 4, 1896.

He joined the Illinois State Dental Society in 1894, and became a life member.

No one prized personal friendship more than Dr. Case, and he was always doing something to show his appreciation of his friends. He invited all the orthodontists practicing in the Chicago area to a luncheon at the Chicago Athletic Club on April 24, 1912, his sixty-fifth birthday. I remember that Mrs. Case came in from Kenilworth as a surprise, bringing a cake she had baked for the occasion. Dr. Case was a gracious host and we spent the afternoon playing billiards or pool at the club. Dr. Case was the champion billiard player of the club. I am sure that this pleasant day did much to promote a feeling of good fellowship among the group in attendance.

DR. CASE'S HOME IN KENILWORTH, ILLINOIS

Dr. Case was noted for his skill in archery and had a court on the spacious grounds of his home in Kenilworth, Illinois, where he practiced daily when weather permitted. He took part in a National Archery Tournament in Chicago in 1909, and ranked second in the Men's Handicap Section. He had another archery court at his summer home on Hamlin Lake in Michigan. Boating and tennis also were favorite pastimes, and he was an excellent rifleman. He enjoyed the woods, the waters, all out-of-doors, and especially the birds.

Dr. Case was not only a perfectionist in technical orthodontic procedures, but he produced many attractive articles in his shop in the log cabin on his Kenilworth grounds. He was an expert craftsman and was particularly proud of several bird houses he built and placed in near-by trees. His carpentry equaled that of an expert cabinetmaker. This was before the era of electrical tools and gadgets. He was particularly proud of his workshop, which contained a number of handsaws and other equipment formerly used by his father and his grandfather. In another portion of the log cabin, Dr. Case wrote most of the material for his books and his numerous essays. Here, too, he photographed plaster casts, face masks, instruments, appliances, and other materials, and made his own illustrations for books and papers.

Dr. Case died on April 16, 1923, a few days before his seventy-sixth birthday, at his home in Kenilworth, Illinois.

Following are the remarks of Dr. C. N. Johnson, one of his close friends and a fellow professor in the Chicago College of Dental Surgery:

"My Friends: I have been asked to do that for the deceased which I am sure he would have willingly done for me. I have been asked to say something at this time on behalf of the members of the profession which he loved so well. We have met to pay tribute of love and loyalty, of comradeship and comfort, of hope and heart-felt homage.

"In the realm of what we call a human life, there is no throne like that of love, no scepter like that of loyalty.

"A man is remembered not so much by the fame he has won, not so much by the reputation he has made, not so much by the power he has wielded, or the place he has attained in the affairs of the world. All of these sink to nothingness compared to the good he has done, and the friends he has made and kept.

LOG CABIN ON GROUNDS OF CASE HOME IN KENILWORTH, ILLINOIS.

"In the flotsam and jetsam of our experience, in the ebb and flow, in the ceaseless throb and beat of life, we test the souls of men in the alembic of their constancy and truth. Measured by this, our dear departed friend will linger long in the minds and hearts of his fellow men.

"Nature was kind to Calvin Case. She endowed him with that wondrous wealth of skill and art which made of him the genius that he was. He waved the magic wand of hope across the deformed faces of little children, and wrought a miracle of symmetry and grace. He reached down into the nethermost depths of disfigurement and despair, and raised the hopeless one into the dawning of a better day.

"He brought joy into the darkened home of many a morbid child, and lightened up the latter days of many a mother's heart. He caused the sad to smile, the dumb to speak, and the despondent to turn their faces toward the glowing light.

"Calvin Case was a benefactor to his race, and on into the dim and distant future of the days to come, his name and fame will travel far and wide wherever the mouths of children are deformed, and mothers' hearts are sad.

"We, his friends, have come today to lay our laurel wreath of love beside his sacred form.

"We commit back to the elements whence it came all that is mortal of our beloved friend. We carry in our hearts the real and true—the memory of loving deeds and cherished hours—of cheer, and hope, and helpfulness, and happiness—all there is of goodness and grandeur, of love and light, between the dawn of human day and the night that we call death."

So ends the story of a great man, who was sincere in his work, and loyal in his friendships.

Charles R. Baker.

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Editorials

AMERICAN ASSOCIATION OF ORTHODONTISTS COMMITTEE AN PATIENT TRANSFERRAL

THE Committee on Patient Transferral was composed of Scott T. Holmes (chairman), Robert D. Jaynes, and Eugene J. Kelly. Their report was read before the 1955 meeting of the American Association of Orthodontists in San Francisco and published in the June, 1956, issue of the AMERICAN JOURNAL OF ORTHODONTICS.

One of the interesting reactions to this report was revealed when Dr. Carman, president of the Rocky Mountain Section of the A. A. O., called a meeting to organize a Public Relations and Education Committee on Oct. 20, 1956. The purpose was to set up a working committee to further good public relations. It was stated at the meeting that it "has been found that there is a need for an organized committee to be available for consultation by the membership for more effective placement of transferred orthodontic cases. When a member orthodontist receives a patient who has been transferred to him from another area, and he feels that the case would be more effectively treated following the established treatment plan in another orthodontist's care, he should consult the Committee."

It was further pointed out by the Rocky Mountain Society's committee, consisting of G. H. Siersma, R. S. Freeman, H. L. Wilson (secretary), and O. H. Devitt (chairman), that the published A. A. O. report should be carefully read. Accordingly, the A. A. O. report was published and circulated among the Rocky Mountain Society membership. This action of the Rocky Mountain group suggested the thought that it is important to give the excellent A. A. O. report added publicity in the hope that it will contribute much more to the efforts of the committees to alert specialists everywhere to the importance of this troublesome subject and its impact on the public relations of orthodontics as a specialty. Many are aware that this is problem No. 1 in orthodontic public relations.

A casual perusal of this committee report will indicate that the committee gave a tremendous amount of work and thought to their report. It is obviously a thankless task devoted to one of the most hazardous threats to the public relations of orthodontics. Then, also, for the reason that many specialists are alert to the much-needed understanding upon this subject, the AMERICAN JOURNAL OF ORTHODONTICS is glad to publish this important report again in 1957.

The report follows.

Report of Committee on Patient Transferral, American Association of Orthodontists

At the 1955 meeting of the American Association of Orthodontists, the president was authorized to appoint a committee to study the matter of improving methods whereby patients may be transferred from one orthodontist to another. This is not a new problem to the A. A. O. In recent years a special committee on ethics studied this and associated problems for three years. During that time they rewrote the "Principles of Ethics" of the A. A. O. which were subsequently adopted. Section 19 of the "Principles of Ethics" read as follows:

> When the circumstances necessitate the transfer of an orthodontic patient, the following obligations shall be fulfilled in the best interests of the dental health of the patient:
>
> (A) The parents shall be informed of all conditions necessary to effect a satisfactory transfer but no commitments shall be made regarding (a) length of time needed by the new orthodontist to complete his treatment of the case; (b) the continuance of treatment with the use of the same appliances; (c) the fee to be charged by the practitioner to whom the case is transferred.
>
> (B) When the judgment of the orthodontist dictates a change in the appliances of a transfer patient, such change shall be effected so as not to endanger the confidence of the patient in his course of treatment. It is unprofessional for an orthodontist to indicate in any way that any remedy, technique, method of treatment, or instrument is exclusive to himself, or to a group of which he is a member.
>
> (C) When the judgment of the orthodontist requires a revision of the diagnosis and treatment previously given a transfer patient, the necessary adjustments should be made, but in no case should the orthodontist comment disparagingly, since he cannot be wholly familiar with the circumstances which dictated the previous diagnosis and treatment.
>
> (D) A free exchange of correspondence and information between orthodontists is advisable in all cases of transfer so that the dental health of the patient may continually be safeguarded.

We of the present committee feel that the Committee on Ethics should be highly complimented for the clear, concise emphasis which they have placed on transfer of orthodontic patients. It is quite possible that they have given all the guidance and direction feasible in dealing with this complicated problem. Were a committee to be more dictatorial, it is possible that it would be exceeding its authority.

However, the fact remains that we still have a serious problem in this important phase of our professional life. If this were not true, then the present committee would not have been appointed. Acting on this premise, we of the present committee have attempted to restudy this problem in the hope that we can shed a little more light on it.

First we would like to make the following observations:

1. Very few orthodontists today are overjoyed by the prospects of having to work additional active transfer cases into already overcrowded schedules. However, we cannot ignore our responsibility to the public and to our profession.

2. It is uncanny how certain problem cases have a way of presenting themselves for transfer just at a very inopportune time, even in the best-controlled practices.
3. The patient and parents are often quite worried about the prospects of the unexpected move. It presents a situation in which an unhappy orthodontic experience can be extremely troublesome and detrimental to all concerned.
4. On the other hand, all of us can recall experiences where fine cooperation between orthodontists has turned an otherwise difficult situation into a very happy experience, highly complimentary to orthodontics.
5. Thus, we observe that, even though the background for orthodontic patient transferrals offers many opportunities for misunderstandings and heartaches, the picture is not all bad by any means. The answer may lie in a frank discussion of our problems, followed by a constructive attempt to retain that which is good and to correct that which is bad.

Now let us try to enumerate some of the most glaring faults in our transferral procedures.

1. Inadequate case histories and treatment records. Regardless of one's concept of diagnosis and treatment methods, it does not seem too much to expect that there should be clear, legible records of all data pertinent to diagnosis and treatment. Actually, this is a legal responsibility. It is almost unbelievable how pitifully inadequate some transfer records really are.
2. Unfounded and braggadocio statements apparently made by some referring orthodontists concerning the great amount accomplished by their treatment and the small amount still remaining to be done.
3. Failure on the part of the referring orthodontist to correspond with the accepting orthodontist and to send him a complete record in advance of the actual move by the patient. If the referring orthodontist does not feel that he has time to send a complete report in advance, how can he remotely expect someone else to be gracious to him and to his partially treated patient?
4. Failure on the part of the referring orthodontist to emphasize to the parents the possibility of subsequent appliance changes, and to prepare the parents for possible changes in financial arrangements. Most parents are very cooperative and understanding when they are pleasantly and adequately informed.
5. Failure on the part of the accepting orthodontist to cooperate enthusiastically. Transferred patients are not "castoffs" or "stepchildren." They have a perfect right to be treated courteously and adequately. They offer one of the greatest opportunities orthodontists have for proving the existence of professional ethics and for demonstrating professional courtesy.
6. Ill-advised and sometimes unjust criticism of the first orthodontist by the second operator. Criticism of another orthodontist is self-incriminating by virtue of the fact that it is criticism of orthodontics itself.
7. Unnecessary delay on the part of the accepting orthodontist in planning and executing treatment for his newly accepted patient.

The sooner the patient is happily situated and integrated into the active treatment schedule, the better for all concerned.

8. The practice of starting cases when the orthodontist anticipates an early move on the part of the patient. Under these circumstances, it would be much better to defer starting treatment until after the move has been completed.

All this boils down to one thing: There is nothing wrong with orthodontic transferrals that cannot be cured by cooperative effort on the part of conscientious orthodontists. It has been said many times, and it bears repeating, that "The Golden Rule can cure all the ills of faulty transferrals in very short order, if the rule is only applied." Each one of us knows basically what constitutes a good case preparation for transferral of an active orthodontic case:

1. If possible, one should choose an orthodontist who uses essentially the same appliance therapy.
2. A letter should be written to the second orthodontist in advance, requesting that he accept the case and giving him the following data:
   (a) Complete case history, including x-ray pictures, casts, photographs, physical history, and all other pertinent data.
   (b) Diagnosis and treatment plan, including description of appliance.
   (c) Record of all treatment therapy given up to date of transferral.
   (d) Financial agreement and original estimated time of treatment. (The present status of patient's account should be included.)
   (e) Any special features of the case should be described, such as patient's personality and degree of cooperation. Special treatment problems should be discussed and anything that might be of help to the new orthodontist should be included.
3. Before the patient leaves, the orthodontist should be sure that all appliances are in good order and that the mouth hygiene is excellent.
4. The patient and parent should be advised that the accepting orthodontist must have full authority to treat the case in the manner which he feels is best. The patient should be reminded that orthodontic therapy envisions continual appliance change throughout treatment and that the new orthodontist will probably make various appliance changes as the treatment progresses.
5. The parents should be informed that fee schedules are not completely uniform throughout the country and that it is reasonable to expect some possible change in fee arrangement.
6. No statements should be made as to the amount of time the new orthodontist will require for completion of the case.
7. The parents should be advised that all records have been forwarded to the new orthodontist and that the referring orthodontist will always be available for consultation.

8. An added courtesy would be to furnish the patient with a letter of introduction to the new orthodontist. This seems to give the patient a feeling of added security.

When an orthodontist accepts a transferral patient he, too, assumes definite responsibilities. They are as follows:

1. He should write a letter of acceptance to the referring orthodontist. If he finds it impossible to accept the case, he should make every effort to assist in securing the services of a third orthodontist.
2. He should study the data transferred to him and discuss the case thoroughly with the parent at the earliest opportunity. If at all feasible, he should maintain approximately the same fee schedule as the original orthodontist. If major financial changes are necessary, these should be explained in a manner that will not constitute a reflection on the former orthodontist.
3. The new patient should be integrated into the treatment schedule as quickly as possible.
4. If major appliance changes are unavoidable, most orthodontists agree that these changes should be made gradually without too much comment.
5. Previous treatment should never be discredited. Most patients think well of previous treatment and do not like to have the original orthodontist criticized.
6. In receiving a transfer, it is well to find something complimentary about the case and discuss it with the patient. It makes for friendly relations.

You will recognize that none of these recommendations are new or revolutionary. They represent a restatement of things that all of us know already. The point is: "How are we going to make these rather self-evident rules work any better in the future than they have in the past?"

We believe it is basically a matter of emphasis and, possibly, education. In educating our membership to a greater realization of the importance of proper handling of our transfer patients, we believe that there are two major avenues of attack. The first approach is through continual repetition. Possibly a larger activating committee, with representatives from all component societies, might be able to work out a continuing plan of emphasis that would bring results.

The second, and possibly more promising, approach to success may be through the medium of our so-called embryo orthodontists. In the future all new members of the A. A. O. are to be graduates of accepted orthodontic departments of universities. In the light of this prospect, your committee contacted the heads of the orthodontic departments in quite a number of our teaching institutions. We are very happy to report that almost all the departments are acutely aware of their responsibility in stimulating and guiding their students' realization of professional ethics and responsibilities to each other. In all but one, the staffs seem to feel that teaching of transferral technique can be considered an important part of orthodontic education. The schools are already doing a good job, but if we, as a profession, were to request still greater emphasis, I am sure that the departments would give the matter serious consideration.

To sum up our case, we of the committee offer no magic plan to cure the present ills. We do feel, however, that continued and greater stress should be placed on the importance of this issue, and that consideration should be given to the advisability of forming a larger activating committee with representation from every component society.

Respectfully yours,
SCOTT T. HOLMES, Chairman
HERBERT D. JAYNES
EUGENE J. KELLY

H. C. P.

EXCUSE FROM SCHOOL

THE Committee on Dentistry for Children of the Missouri State Dental Association (R. D. Korns, Chairman) has come up with at least a partial solution to the school problem that is so important in connection with accomplishing satisfactory dental treatment for children.

The Missouri State Dental Association points out, in a letter to its membership, that the following School Excuse Form is acceptable over the entire State of Missouri. It is suggested by the Missouri State Dental Association Committee that this form be used at all times when it is necessary to make a dental appointment with school children.

This is a great step in the right direction and it helps make satisfactory orthodontic treatment for school children possible. It is noted that many states are adopting similar excuse forms with the approval of the school authorities.

Both sides of the Missouri form follow:

EXCUSE FORM FOR DENTAL APPOINTMENT

NAME OF PUPIL_____

HAS AN APPOINTMENT FOR NECESSARY DENTAL SERVICE ON
DATE OF APPOINTMENT_____ 19____

HOUR OF APPOINTMENT _____ A.M._____P.M._____
This service cannot be rendered satisfactorily outside of school hours.

_____D.D.S.

This appointment was made with my knowledge and approval.

_____
SIGNATURE OF PARENT

GOOD DENTAL HEALTH GOES HAND IN HAND WITH GOOD GENERAL HEALTH

Proper diet, thorough tooth-brushing and regular and frequent examinations by a dentist will lead to better dental health for children.

This form was proposed by the MISSOURI STATE DENTAL ASSOCIATION for cooperative use of the parent, the school and the dentist.

Department of Orthodontic Abstracts and Reviews

Edited by
DR. J. A. SALZMANN, NEW YORK CITY

All communications concerning further information about abstracted material and the acceptance of articles or books for consideration in this department should be addressed to Dr. J. A. Salzmann, 654 Madison Avenue, New York City

Periodontal Therapy. By Henry M. Goldman, D.M.D., F.A.C.D., Director of the Riesman Dental Clinic, Beth Israel Hospital, Boston, Professor of Periodontology and Chairman of the Department of Periodontology, Graduate School of Medicine, University of Pennsylvania, Lecturer in Dentistry, Faculty of Medicine, School of Dental and Oral Surgery, Columbia University; Saul Schluger, D.D.S., Associate Clinical Professor of Dentistry, Faculty of Medicine, School of Dental and Oral Surgery, Columbia University; and Lewis Fox, D.D.S., F.A.C.D., Associate Professor of Periodontology, Graduate School of Medicine, University of Pennsylvania, Associate Clinical Professor of Dentistry, Faculty of Medicine, School of Dental and Oral Surgery, Columbia University. The C. V. Mosby Company, St. Louis. 565 pages. With 190 text illustrations and 100 plates. Price, $18.75.

This text is intended for the practitioner and approaches the subject from the standpoint of case management in periodontal therapy. In every chapter, whether it be on root scaling, gingival curretage, treatment of infrabony pockets, or occlusal adjustment, there are included discussions of etiological and diagnostic factors.

Of special interest to orthodontists are the chapters on occlusal adjustment and orthodontics in periodontal therapy. Occlusal adjustment, it is pointed out, seeks to create tooth contacts which are more physiologically and biologically acceptable to the supporting tissues. Such adjustments, however, should not impair chewing, swallowing, or speech.

Orthodontists have not given much attention to proprioceptive and exteroceptive functions as they relate to the dental organs. It may well be that since orthodontic therapy is a comparatively slow process, the patient gradually learns new functional patterns during the treatment period. Since tooth grinding in occlusal adjustment leads to abrupt changes, the authors warn that the procedure "... must not disturb the negative occlusal sense of the patient, ... proprioceptive and exteroceptive qualities to which the patient has become accustomed. ..."

Information is provided on the technique of occlusal adjustment and on correction of tooth form discrepancies. This is a valuable technique which the orthodontist should master to assure success where dimensional discrepancies in tooth size exist in dental arches. It would seem to this reviewer that much work still remains to be done in orthoperiodontic techniques to establish when either orthodontic, periodontic, or a combination of both disciplines would benefit the patient under treatment. The use of orthodontic procedures by the periodontist without knowledge of orthodontic principles is a regression to the era of mechanical empiricism and may well prove harmful to the patient. It

goes without saying that the orthodontist can do much damage to the dental and periodontal tissues if he undertakes periodontic procedures without adequate preparation and knowledge in this field. The chapter on orthodontics in periodontal therapy is interesting but the procedures should be carried out with competent orthodontic consultation.

The effects of oral habits on the periodontal tissues are discussed. This reviewer has called attention in the past to the effects of "occlusal mannerisms" on the permanency of orthodontic therapy.

Orthodontists will find much common ground in this book on periodontal therapy. The authors have stressed techniques throughout. The illustrations are excellent and the book has a good index.

J. A. S.

Pharmacology and Oral Therapeutics. A Textbook for Students and Practitioners. By Edward C. Dobbs, B.S., D.D.S., F.A.C.D., Professor of Pharmacology and Therapeutics, Dental School, University of Maryland. Eleventh edition. St. Louis, The C. V. Mosby Company, 1956. 579 pages. Price, $9.00.

The present edition of this standard work is intended as a reference book on the newer drugs and pharmaceutic preparations of use in dental practice. It is also intended as a text in teaching pharmacology to dental students. A chapter is devoted to the pharmacology of dietary factors, including the vitamins and the trace elements.

Section Two includes drugs, formulas, and prescriptions useful in dental practice. The title of this edition has been changed from *Pharmacology and Dental Therapeutics* to *Pharmacology and Oral Therapeutics* to designate the inclusion of new material pertinent to the field of oral medicine. The chapter on prescription writing and the various tables will be found of practical value.

A Symposium on Preventive Dentistry. With Specific Emphasis on Dental Caries and Periodontal Diseases. Edited by Joseph C. Muhler, D.D.S., Ph.D., Associate Professor, School of Dentistry and Department of Chemistry, Indiana University, Bloomington, Indiana, and Maynard K. Hine, D.D.S., M.S., Dean, School of Dentistry, Indiana University, Indianapolis, Indiana. St. Louis, The C. V. Mosby Company, 1956. 266 pages. Price, $6.75.

A total of twenty-seven contributors are listed as authors of the twenty-four chapters which constitute this text. The contributors are well known in dentistry and are regarded as authorities in their respective fields.

H. Trendley Dean, who knows whereof he speaks, points out that more progress has been made in the control and prevention of dental caries on a mass basis "in the past twenty years than in the previous twenty centuries." The relation of carbohydrate intake to dental caries is discussed by Philip Jay, and Joseph F. Volker discusses the role of fat in the etiology, control, and prevention of dental decay. James H. Shaw, associate professor of biological chemistry at the Harvard School of Dental Medicine, closes the discussion of nutrition as related to dental caries with the statement that ". . . the greatest hope for a reduction in the dental caries experience of future generations lies in the use of nutritional procedures to develop teeth with an increased resistance. . . ."

A chapter on "Prevention of Malocclusion" by J. William Adams is included. The frequency of malocclusion is mentioned and the general practitioner is called upon to include preventive measures in his practice.

Those who are interested in the etiology of dental caries will find in this text a valuable fund of information. The teacher of pedodontics and dental public health official may also use this text to good advantage.

J. A. S.

We are sorry to report that Dr. Homer Robison, pioneer orthodontist, died on Monday, February 11, in Hutchinson, Kansas.

News and Notes

Scientific Program and Other Related Activities for the Meeting of the American Association of Orthodontists, May 12-16, 1957, Roosevelt Hotel, New Orleans, La.

The sustaining strength of a professional society such as the American Association of Orthodontists lies in the sense of objective realism to be found in the scientific program. The good name of a society is determined by its essays, clinics, conferences, and discussions, and these, to a considerable degree, by the quality and standards of the participants. These facts influence substantially the potential and ultimate progress of the Association and the specialty toward improved methods of diagnosis and treatment.

For 1957 the scientific sessions of the first day (May 13) are devoted to etiology and are arranged to provide a natural sequence or "flow." Each speaker will discuss a specific phase of causation from the negative as well as from the positive aspects. We believe that this provides a coordination of effort and instruction not possible when unrelated papers are read.

The second day (May 14, morning session) likewise has a natural "flow" devoted to treatment. Each speaker has been asked to discuss principles of treatment measures as related to age groups. There will be table and projection clinics, a round-table luncheon discussion, and reports of research.

An innovation this year will be "conference rooms" on case analysis and treatment planning. This can be very useful to our members, and they are urged to take advantage of it. Members of the Association are invited to prepare a problem case, one which prior to treatment or during treatment has given trouble, for submission to the staff of a conference room for diagnosis, analysis, and advice. Cases should be supported by written history and available diagnostic records. Further information may be obtained from Dr. H. K. Terry, 2742 Biscayne Blvd., Miami, Florida.

A thesis written by a successful candidate to the American Board of Orthodontics (1956) will be read.

There will be an exhibit of case reports by diplomates of the American Board of Orthodontics.

Two panels will complete the scientific program, one relating to personality and psychological problems and the other to the many details of practice management.

The American Board of Orthodontics will present the Ketcham Award.

The detailed schedule follows:

Sunday, May 12

2:00 to 5:00 P.M. Registration (everyone who can possibly do so is urged to register at this time).

Monday, May 13

8:00 A.M. Registration—your officers strongly recommend that you do not wait until the last minute to register—the desk will be open for registration Sunday, May 12.

9:00 to 9:30 A.M. Invocation. Rev. John F. Keller, S.J., Chaplain, Dental School, Loyola University, New Orleans, Louisiana.

Address of Welcome. Hon. deLesseps Morrison, Mayor of New Orleans, Louisiana.

Response. Franklin A. Squires, White Plains, New York, president-elect of the American Association of Orthodontists.

9:30 to 10:00 A.M. President's Address. A. C. Broussard, New Orleans, Louisiana.

10:00 A.M. SCIENTIFIC PROGRAM.

Presiding: George M. Anderson, Baltimore, Maryland, program chairman.

The sessions of the first day are devoted to etiology and are arranged to provide a natural sequence or "flow." Each speaker will discuss a specific phase of causation, from the negative as well as from the positive aspects. In this way, we believe, there is a coordination of effort and instruction not possible when unrelated papers are read. Therefore, we have a basic subject heading or title for the papers for this day, two in the morning and two in the afternoon.

Basic Subject: "Malocclusion Is a Resultant of—"

10:00 A.M. Genetics. Harold J. Noyes, Portland, Oregon.

11:00 A.M. Bone Inequities. Harry Sicher, Chicago, Illinois.

12:30 P.M. Golden Anniversary Luncheon. William B. Stevenson, Sr., Amarillo, Texas, Vice-President, American Association of Orthodontists, presiding.

2:30 P.M. Scientific Program (Cont'd).

Presiding: Frank Bowyer, Knoxville, Tennessee, president, Southern Society of Orthodontists.

2:30 P.M. Intrinsic or Local Factors. Thomas D. Speidel, Minneapolis, Minnesota.

3:30 P.M. Extrinsic or General Factors. T. M. Graber, Chicago, Illinois.

Tuesday, May 14

9:00 A.M. Scientific Program (Cont'd).

Presiding: Tom M. Williams, Dallas, Texas, president, Southwestern Society of Orthodontists.

This morning also is planned to have a natural sequence which is devoted to treatment. Each speaker will discuss a specific age group under a basic subject heading or title of "Aims and Methodology of Corrective Measures According to Age Groups." Webster defines *methodology* as a "branch of logic dealing with principles of procedure whether of theoretic or practical science."

9:00 A.M. The Deciduous Dentition. Edward A. Cheney, Lansing, Michigan.

9:45 A.M. The Mixed Dentition. Faustin N. Weber, Memphis, Tennessee.

10:30 A.M. The Permanent Dentition. Malcolm R. Chipman, Spokane, Washington.

11:30 A.M. Presentation of the Albert H. Ketcham Memorial Award of the American Board of Orthodontics by Ernest L. Johnson, San Francisco, California, president, American Board of Orthodontics. Acceptance by Oren A. Oliver, Nashville, Tennessee.

12:30 P.M. Past-Presidents' Luncheon.

1:30 P.M. Research Program conducted by the Research Committee, Presiding: Alton W. Moore, Chairman, Seattle, Wash.
The Prize-Winning Essay.
Essayists receiving honorable mention.
Research reports, in person and by title.

4:00 P.M. Business Session of the American Association of Orthodontists.

Wednesday, May 15

9:00 to 11:30 A.M. Table and Projection Clinics.
In charge: William S. Brandhorst, St. Louis, Missouri, Program Committee member.

12:00 M. to 2:30 P.M. Round-Table Discussion Luncheon.
In charge: Arnold Stoller, Seattle, Washington, Program Committee member.

2:45 to 4:45 P.M. Conference Rooms. "Case Analysis and Treatment Planning."
In charge: H. K. Terry, Miami, Florida, Program Committee member.
These rooms are an innovation. Their purpose is to provide an opportunity for practitioners with problem cases to have them analyzed and discussed by "diagnosticians and assistants" with the hope that the problem may be relieved or lessened.

Members of the Association are invited to prepare a problem case for submission to one of the conference rooms and they are requested to contact Dr. Terry for advice as to further procedure. Cases should have a written history supported by available diagnostic records.

We believe this to be an outstanding opportunity to receive help with your orthodontic problems. Take advantage of it.

Each conference room will have a "diagnostician" who will have an "assistant." They are:

Diagnostician	*Assisting*
1. Philip Adams	William H. Oliver
2. Spencer Atkinson	Ted Gettinger
3. J. Lyndon Carman	Hubert J. Bell, Jr.
4. Edward Cheney	Harlow Shehan
5. Malcolm R. Chipman	Alton W. Moore
6. G. Vernon Fisk	Ross O. Fisk
7. T. M. Graber	Glenn Jackson
8. Andrew Jackson	John Jackson
9. Herbert I. Margolis	Eugene Nelson
10. Oren Oliver	Boyd Tarpley
11. Paul Reid	J. Henry O'Hern, Jr.
12. J. A. Salzmann	Meyer Eggnatz
13. Robert Strang	Will Thompson
14. Raymond Webster	Donald Osborn
15. Albert Westfall	Marcus Murphy

Thursday, May 16

9:00 A.M. Scientific Program (Cont'd).
Presiding: W. Paul Hoffman, Washington, D. C., Program Committee member.
"Some Illusory Phenomena of Importance in Orthodontics." (An original thesis presented to the American Board of Orthodontics toward certification.) Donald MacEwan, Seattle, Washington.

9:45 A.M. Panel.*
Subject: Parent and Patient Personality and Psychological Problems.
Moderator: William S. Smith, San Francisco, California.
Panelists: M. Duke Edwards, Montgomery, Alabama.
T. M. Graber, Chicago, Illinois.
Kyrle W. Preis, Baltimore, Maryland.
Phillip W. Starr, Omaha, Nebraska, will open the discussion with a brief generalized statement.

11:00 A.M. Panel.*
Subject: Office Procedures, Business Management, Office Location, Associations, and Partnerships.
Moderator: Brooks Bell, Dallas, Texas.
Panelists: Stephen C. Hopkins, Sr., Washington, D. C.
V. Everett Hunt, Eureka, California.
Cecil Muller, Omaha, Nebraska.
Alexander Sved, New York City.

12:30 P.M. Business Session of the American Association of Orthodontists.
Adjournment.

American Board of Orthodontics

The next meeting of the American Board of Orthodontics will be held at the Roosevelt Hotel in New Orleans, Louisiana, May 7 through 11, 1957. Orthodontists who desire to be certified by the Board may obtain application blanks from the secretary, Dr. Wendell L. Wylie, University of California, School of Dentistry, San Francisco 22, California.

Applications for acceptance at the New Orleans meeting, leading to stipulation of examination requirement for the following year, must be filed before March 1, 1957. To be eligible, an applicant must have been an active member of the American Association of Orthodontists for at least two years.

Rules Covering Visitors to the 1957 Meeting of the American Association of Orthodontists, May 13 Through May 16, Roosevelt Hotel, New Orleans, La.

To insure full participation of all members, it is necessary to limit attendance to fully privileged members of the American Association of Orthodontists and the following:

A. *No Attendance Fee*

1. Full-time teachers in university dental schools.
2. Full-time graduate or postgraduate students in university orthodontic departments.
3. Dentists from outside Canada or the United States of America who are members of recognized dental or orthodontic organizations.

B. *Attendance Fee $10.00*

1. Associate or junior members of constituent societies of the American Association of Orthodontists.
2. Recent graduates of university orthodontic departments who are in service.

C. *Attendance Fee $20.00*

1. Recent graduates of university orthodontic departments who are not members of constituent societies of the American Association of Orthodontists.

*You are invited to mail to the moderators prior to the meeting any questions in which you may have a special interest.

2. Other guests certified by the Credentials Committee.
To qualify under this heading you must:

(a) Be endorsed by two active members of the American Association of Orthodontists in your vicinity.

(b) Be a member in good standing of the American Dental Association.

(c) Not have been rejected for membership in any of the constituent societies.

Those desiring to attend the meeting who qualify under the categories listed above should contact the chairman of the Credentials Committee for approval of their credentials.

Credentials Committee,
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MARION A. FLESHER
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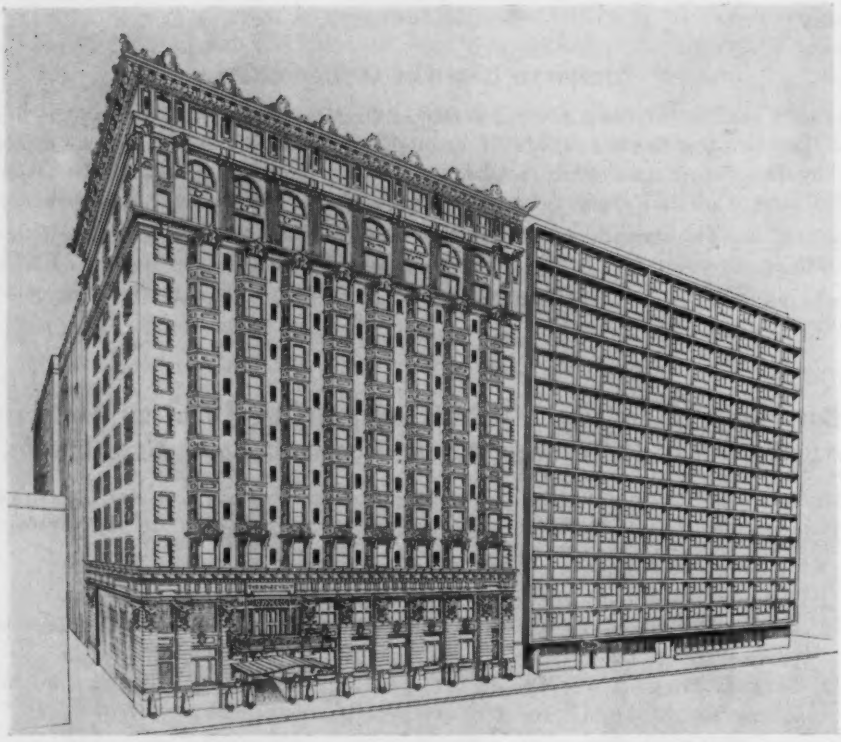

The Roosevelt, headquarters hotel for the 1957 annual meeting of the American Association of Orthodontists in New Orleans, May 12 to 16, 1957.

American Association of Orthodontists
Hotel Accommodations for 1957 Annual Meeting

Hotel accommodations for the 1957 meeting of the American Association of Orthodontists to be held May 12 through May 16, 1957, in New Orleans, Louisiana, will be made through the office of Dr. B. G. Frick, Jr., 1231 Maison Blanche Bldg., New Orleans 16, Louisiana.

All reservations of rooms will be made in the order in which the requests are received. It is recommended that you send in your applications as soon as possible, as requests must be received before April 27.

Our allotment of rooms is at the following hotels, all within a radius of three and one-half blocks from the headquarters hotel, the Roosevelt.

Approximate Range of Room Rates

Hotel	*Twin*	*Double*	*Single*	*Suites*
Roosevelt (headquarters hotel)	$14—15—18	$11—12	$8—9	$30 up
St. Charles	$13—14—15—16	$ 9—10—11	$6—7—8—9	
Jung	$11—12—14—15	$10—12—13—15	$7—8—9	
Monteleone	$12—13—14—15	$ 9—10—11	$6—7—8—9	
New Orleans	$11—12	$ 8— 9	$6—7	
De Soto	$10	$ 7— 8	$5.50—6	

Please indicate your first, second, and third choice of hotels and date of arrival.

Dr. B. G. Frick, Jr.
1231 Maison Blanche Bldg.
New Orleans 16, La.

Name: ----------

Address: ----------

Please make the following reservation for me to attend the A. A. O. convention in New Orleans, beginning May 12, at the following hotel:

Choice of Hotel	Type of Room and Approximate Rate
1 ----------	----------
2 ----------	
3 ----------	

Date of arrival ----------

American Association of Orthodontists Conference Rooms

Conference rooms for case analysis and treatment planning will form a part of the 1957 New Orleans program. They will be scheduled for Wednesday afternoon, May 15.

Each member of the Association is invited to bring a problem case with history, photographs, casts, radiographs, cephalographs, or other data the member considers necessary. This he will turn over to an "assistant" to the "diagnostician," who will present the material for discussion for the benefit of the orthodontists in attendance. Questions and answers should help clarify the problems.

While this is an innovation, the Program Committee believes that these conference rooms offer a real opportunity for cooperation and participation by members who have had difficult problems and have needed qualified help in solving them.

This is your invitation to participate, but you must advise the Program Committee (Dr. H. K. Terry, 2742 Biscayne Blvd., Miami, Florida) at least by April 12, 1957, that you wish a case analysis, so that proper scheduling of the conference rooms may be made.

The Program Committee for the New Orleans meeting feels that some of the gap can be bridged between training with empirical diagnosis and experience with intangible

factor diagnosis. It may be accomplished by getting the experienced diagnostician to relay his thinking as he diagnoses, analyses, evaluates, and plans treatment for a specific case.

When the diagnostician presents a case that he has already gone over and even treated successfully, these thought ramifications are not likely to come out in the presentation of that (his own) case.

We feel, therefore, that if a member brings a case with a history, photographs, casts, radiographs, etc., as he would routinely have in his office (or as he would prepare it for the American Board) and this case is presented to the diagnostician by an "assistant" or "supervisor," the thinking of the diagnostician would be of value to all those present. The case should be a problem case, not yet treated or in the process of being treated. The member gives the case material to the assistant who presents it to the diagnostician and those present. The assistant and the diagnostician discuss points that bring out the thinking process that goes into the analysis and treatment planning.

The only problem is that the patient himself should be present, but all of us understand this and must properly weigh it in the balance with any diagnosis given.

Those wishing to present a case to a diagnostician must let the Committee know at least one month prior to the meeting. The actual material need not be sent; just a letter requesting the review of your case by one of the diagnosticians will suffice.

Columbia University

The alumni of the Columbia University Department of Orthodontics announce that a cocktail party will be held at the Roosevelt Hotel in New Orleans on Monday, May 13, in the Creole Suite at 4 P.M. in celebration of Columbia's thirtieth year of service to the specialty of orthodontics.

All graduates of the orthodontic course and guests are welcome.

University of Rochester School of Medicine and Dentistry

A number of fellowships are now available to dental graduates who are interested in research and additional training in the sciences fundamental to dentistry. Candidates will be selected on the basis of scholastic record, promise in research, and genuine interest in an academic career in dentistry.

Accepted candidates who qualify for admission to the Graduate School may prepare themselves for the M.S. or Ph.D. degree in one of the following sciences: anatomy, bacteriology, biochemistry, pathology, pharmacology, physiology, and radiation biology.

St. Louis University

St. Louis University School of Dentistry announces a two-week course in orthodontics featuring the Charles H. Tweed technique. The course is under the direction of Drs. Samuel J. Lewis, Copeland Shelden, and the faculty of the University.

T. M. Graber on Lecture Tour

Dr. T. M. Graber, Associate Professor of Orthodontics at Northwestern University and Director of Research at the Northwestern University Cleft Lip and Palate Institute, is now on an International Educational Exchange Service lecture tour of the Far East and Middle East. The tour is sponsored by the State Department.

Dr. Graber has been invited to visit medical and dental schools in this part of the world, and he will speak before faculty and student groups and national and local societies in Japan, the Philippines, Thailand, India, Iraq, and Greece—some fifty-six lectures in forty days.

European Orthodontic Congress and Rome Meeting of Fédération Dentaire Internationale

The thirty-third congress of the European Orthodontic Society will be held in Geneva, Switzerland, Aug. 29 to Sept. 2, 1957, instead of August 9 to 13 as reported on page 73 of the January issue of the JOURNAL.

The Rome meeting of the Fédération Dentaire Internationale will be held Sept. 7 to 14, 1957. Thus, members attending the Geneva meeting will have ample time to go on to Rome for the Fédération Dentaire Internationale congress.

Notes of Interest

Dr. Nelson D. Bookstaver announces the limiting of his practice to orthodontics, 112 S. Washington Ave., Bergenfield, New Jersey.

Paul A. Ebeling, D.D.S., announces the opening of his offices at 6123 West Florissant Ave., St. Louis, Missouri, practice limited to dentistry for children and orthodontics.

Dr. Walter H. Ellis announces the association of Dr. Laurence C. Wright at 333 Linwood Ave., Buffalo, New York, practice limited to orthodontics.

Dr. Herbert D. Henig announces the opening of a new office at 82 Broadway, Hicksville, Long Island, New York, for the exclusive practice of orthodontics.

Martin J. Mayeau, D.D.S., announces the formation of a partnership with Connell C. Medley, D.D.S., for the practice of orthodontics at 705 Waukegan Bldg., 4 S. Genesee St., Waukegan, Illinois.

John Lee Smith, D.D.S., announces his entrance into the practice of orthodontics, Casa Linda Bldg., Dallas, Texas.

Dr. Daubert Telsey announces the opening of an office for the exclusive practice of orthodontics at 64-20 99th St., Rego Park, New York.

Tobias Weissman, D.D.S., announces the removal of his office to Professional Arts Bldg., 1245 E. Colfax Ave., Denver, Colorado, practice limited to orthodontics.

OFFFICERS OF ORTHODONTIC SOCIETIES

The AMERICAN JOURNAL OF ORTHODONTICS is the official publication of the American Association of Orthodontists and the following component societies. The editorial board of the AMERICAN JOURNAL OF ORTHODONTICS is composed of a representative of each one of the component societies of the American Association of Orthodontists.

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Forthcoming meetings of the American Association of Orthodontists:
1957—Roosevelt Hotel, New Orleans, Louisiana, May 12 to 16.
1958—Commodore Hotel, New York, New York, April 27 to May 1.
1959—Statler Hotel, Detroit, Michigan, May 4 to 7.

*Deceased.

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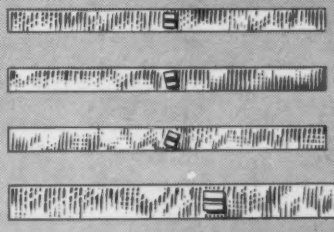

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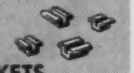

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610 Pages, 395 Illustrations

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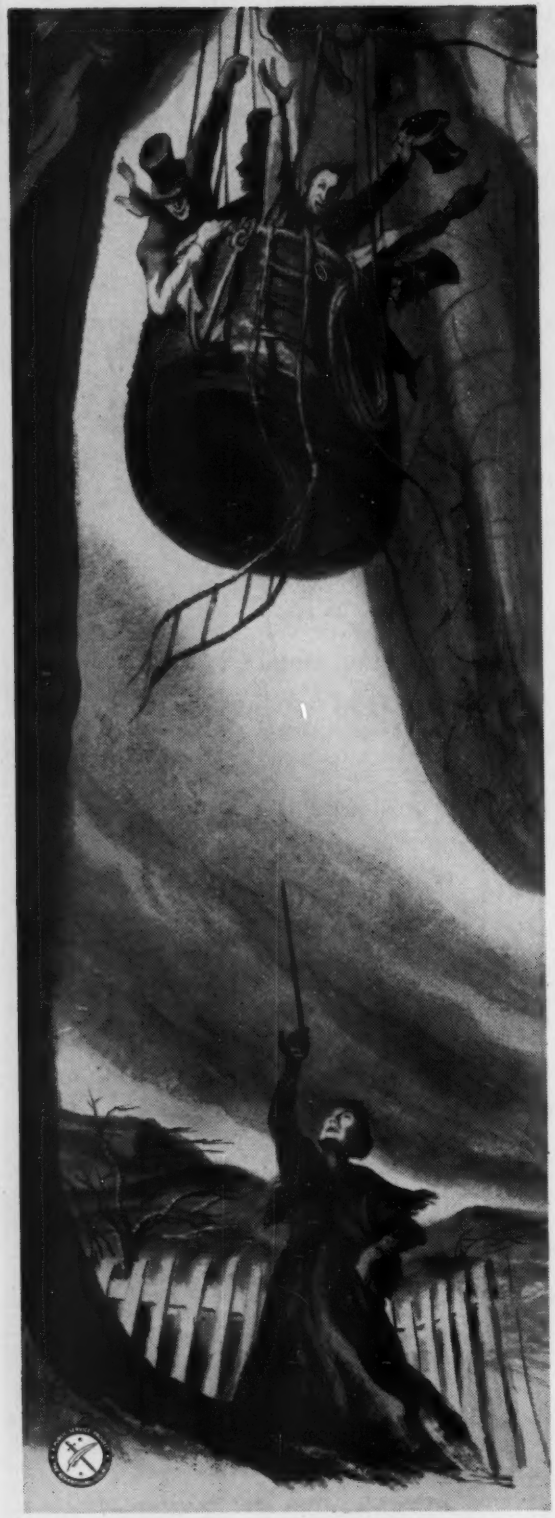
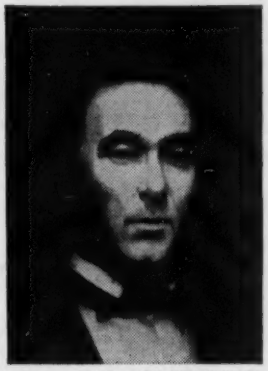


The old lady gave him what for



From AMERICAN HERITAGE

AN OLD LADY living near Henderson, N. Y. in 1859 was shocked at the way the four men had arrived—and said so. Such sensible-looking men in such an outlandish vehicle!

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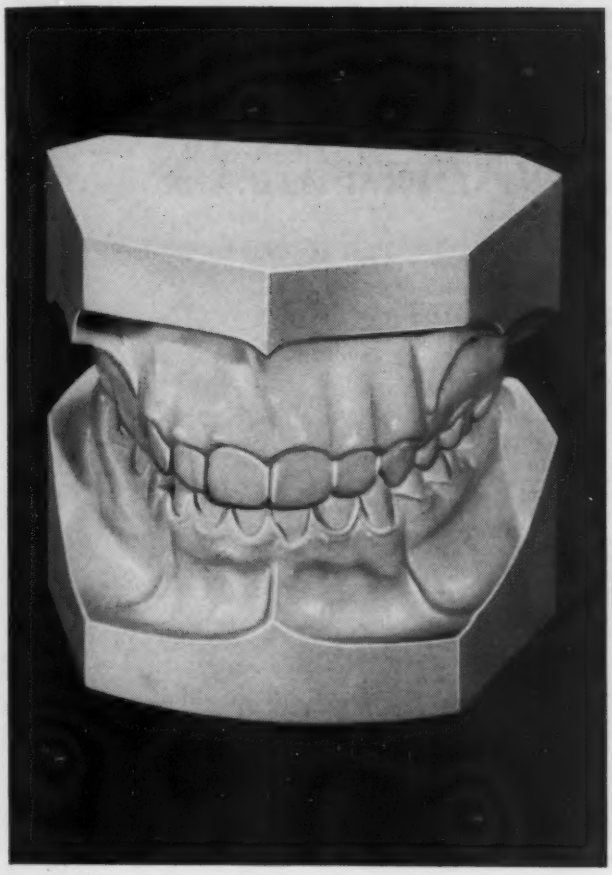

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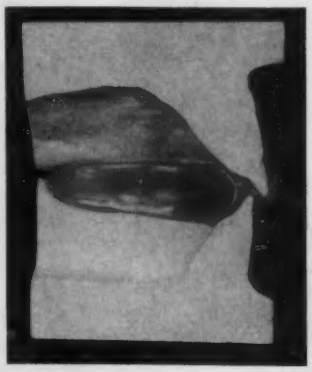

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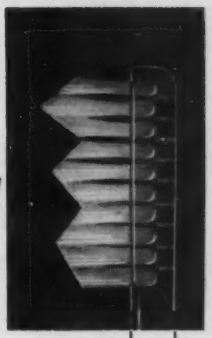
"Shorty"



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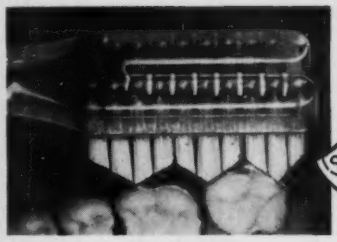

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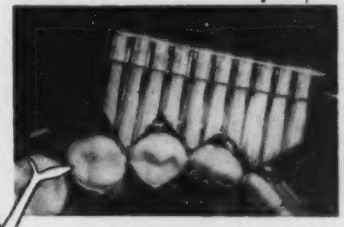

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